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TELEPHONE ENGINEER

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Editorial Mention

Using the Telephone

The telephone was not invented and perfected to be used for social gossip. The real purpose of this modern convenience is to annihilate distance, to place people in speedy and direct communication with each other and to serve as an inestimable asset in the world of business especially.

A great number of people, women in particular, are prone to misuse their privilege. They will stand at the telephone sometimes as long as ten to fifteen minutes and idly gossip and chatter to their hearts' content, unmindful that perhaps some one is anxious to use the line on a matter of importance. Of course there is a little more excuse for the women on the farms to engage in a social visit over the phone, their neighbors are not so close, but for people in the towns there is no excuse for a long drawn out dialogue, which generally, after all, amounts to nothing in particular. If you must tell a long story over the telephone make it a serial and run it in episodes throughout the day. In this way some poor, tired business man may have a chance to call his wife to enquire whether or not there is anything in the house to eat, or a physician could be speedily summoned in case of illness.

Observe the Golden Rule in the use of your telephone and all subscribers would have more satisfactory service.

Telephony or Telepathy

The telephone gets blamed for a whole lot of things and the gentle operator often gets bawled out by the irate subscriber or the fellow who is borrowing somebody else's telephone. On the other hand the telephone and the gentle operator are not always credited with all they should be and they deserve mention when they add telepathy to their other accomplishments. That must explain this incident. A few days ago a subscriber at Jeffersonville wished to telephone to Mr. Smith and was told at his office that he had just gone to the bank. The subscriber called the bank number while actively thinking of Mr. Smith; the telephone operator—or her subconscious self, let us say—plugged in at quite another number of course "Is this the bank?" "No, this is the newspaper office." "Sorry, I was looking for Mr. Smith." "Well, wait a minute; he has just stepped in." How's that for service?"

Where the Telephone Is Popular

When it is recalled that the inventor of the telephone is still hale and hearty, its spread to all quarters of the globe seems marvelous indeed, but to find that it is in the Philippine city of Manila, that people are said to be the most dependent on its use and to maintain the highest average of calls per telephone is an added unique fact which makes the story of the development and spread of the telephone even more miraculous and fascinating.

Manila's telephone system was established in 1906, with a thousand instruments. Today there are nearly nine thousand subscribers served through the central office and it is expected that soon there will be another thousand added. Some delay has been caused on the installation of these new instruments by the inability to get the material.

The Philippine Islands Telegraph and Telephone Co., which owns and operates the system, is a Nevada corporation and its franchise covers the whole island of Luzon. Manila is connected with all outlying suburbs by telephone, having a main office and four branches in the city connected with suburban points.

In one respect telephone matters in Manila are not up to date. In spite of the fact that the personnel and equipment charges have more than doubled, the rates which were established in 1905 have never been raised.

The Wireless Telephone and Movies

Delay in synchronizing the motion picture and the phonograph, which has been the dream of inventors, suggests that there are factors beyond the realm of the mechanical with which scientists are not competent to deal, and bids us receive with caution the prediction of a French physicist that groups of motion picture theaters in the near future will throw the same picture on the screen at the same time while actors will "speak their parts into *wireless telephone* instruments." The recent success of the wireless concert given by Madame Melba, in which audiences in Paris, Berlin and Rome simultaneously heard the rich notes of the diva's voice, gives color to the Frenchman's prediction, but somehow does not wholly establish our faith that it will be made good.

It is thirty years this year since it was prophesied that the union of telegraphy with the typesetting machine would greatly reduce the man power required to edit and print the newspapers of the world. The central news service, disseminated by wire directly to the keyboards of a hundred thousand Mergenthalers in a thousand cities and towns, is still the dream of theorists, but it is as far from realization as it was in 1890. There is a point at which the most resourceful find an impasse. The machine clogs where the factor of human co-ordination enters in.

It may be that some genius—of a director, not an inventor—will devise a way to synchronize the Chaplins and the Baras and the Fairbanks with the wireless telephone, but there are doubts about it. We have infinite faith in the power of the machine, but here our credulity breaks down. The human temperament is altogether another thing.

Telephone Pictorial News

Photo by International

The World's Greatest Zinc Mine at Franklin, N. J., Has an Elaborate Telephone System.

Mmme. Tetrazzini, in Her Apartments in New York City, Singing Over Radio to the Middies on Every Battleship in New York Harbor.

Photo by Keystone

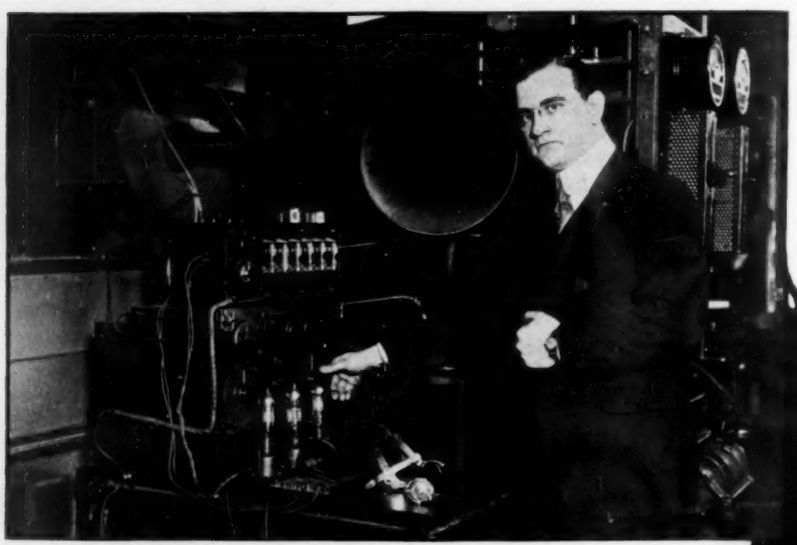

Photo by International

Professor Goldsmith and His New Wireless Megaphone Receiving Instrument at New York City College.

Receiving a Telephone Message from a Fireman Equipped with a Telephone Helmet, Who Is Reporting the Condition in a Gas Filled Cellar.

Photo by Keystone

Telegraph and Telephone Engineering

Description of New York Central Lines Telegraph and Telephone Equipment Given in Paper Before Midwinter Meeting of A. I. E. E.

By STANLEY RHOADS
Telegraph and Telephone Engineer, New York Central Lines

RAILROAD telegraph and telephone departments entered a new era when telephone train dispatching was adopted 13 years ago. In the last five years electrical engineers have been employed in these departments in increasing numbers, and the development has become more rapid. Previously the telegraph and telephone departments of the railroads were content to depend on outside interests for ideas, equipment, methods of operation and development, and as a result the development was slow. The staff of one railroad telegraph department, with engineers continuously employed, has procured considerable advancement in the railroad telegraph and telephone plant in a space of four years, perhaps as much as was accomplished by all railroad telegraph and telephone departments in the four years previous to the period mentioned. This is attributed to the intensive application of electrcal engineers to practical problems and obvious requirements of railroad service.

A difficulty confronting the engineer in the investigation of a problem is to learn the start of the art in relation to the particular problem in hand. It is somewhat with the idea of presenting some data on the state of the art, as applied to railroad telegraph and telephone system, that data and results of investigations are given here. It is hoped that any incomplete investigations can be continued by the engineers of the New York Central Lines and others; that any false conclusions can be pointed out, and that the data here presented may suggest investigations along other similar lines and on related problems.

In order to interest others than railroad engineers in these problems, it can be said that the railroad telegraph and telephone engineer, particularly of the larger railroads, has problems of a variety that includes a little of about everything confronting the plant and traffic engineers of the large telephone and telegraph companies that have nation-wide service. The extent and distribution of the plant are the chief differences. This variety gives absorbing interest to the work. As the staff of the telegraph department is small, its engineers are obliged to handle any problem that arises as best they can.

New York Central Lines Telegraph and Telephone Plant.

The plant under the supervision of the New York Central Lines Telegraph Department comprises 6 per cent of the total Western Union pole line and 12 per cent of the wire, and includes 12,000 miles of pole line with 80,000 miles of copper wire, of which 40,000 are used by the railroad; 76,000 miles of iron wire, of which 25,000 are used by the railroad on 12,000 miles of rail line. This includes a New York-Chicago long-distance telephone line, shown in Fig. 1, which has telephone repeaters, composite equipment, phantom circuits and loaded cable. Practically all other important points from New York and Boston, to St. Louis and Chicago are connected in the network of service. Vacuum-tube telephone repeaters are installed at Albany, Syracuse, Cleveland, Toledo and Elkart, with one or two additional stations soon to be installed. These lines connect railroad telephone exchanges in some cases larger than required to serve the public in small cities. The total number of long-distance calls handled is about 5,000 per day. New York and Chicago have 12 position boards, and others are in proportion to the amount of business done. The New York Central Lines have about 5,500 telephones on P.B.X. boards and 4,000 direct exchange lines. The number of local calls is enormous, but is not kept count of ordinarily. City calls are counted by the telephone companies in order to make the billing where this is on measured rates. These boards are operated by the railroad, but furnished and generally maintained by the Bell telephone companies. The railroad offices in large cities have numerous one-position sub-boards in various departments.

The railroad telegraph service, with its network of 40,000 miles of copper and 25,000 miles of iron wire in its own service, reaches 3,700 offices. The centers of operation at headquarters of the general staff of the railroads have large offices called general telegraph offices. The division headquarters telegraph offices are called relay offices. This office serves two telephone dispatching circuits, two phantoms, four yard lines, two Western Union way Morse wires, four railroad single line Morse wires, two of which are connected through repeaters, three duplex Morse wires, two of which are connected through repeaters. New York has a force of 20 telegraph operators, Indianapolis 18, Detroit 16, Chicago 14, Cleveland 13, and other cities in proportion.

The telegraph service is more extensive than the telephone long-distance system, because it must reach every station and office on the system; whereas, the telephone long-distance service is limited to the offices and employes who have Bell telephones that connect to the railroad telephone exchanges, and

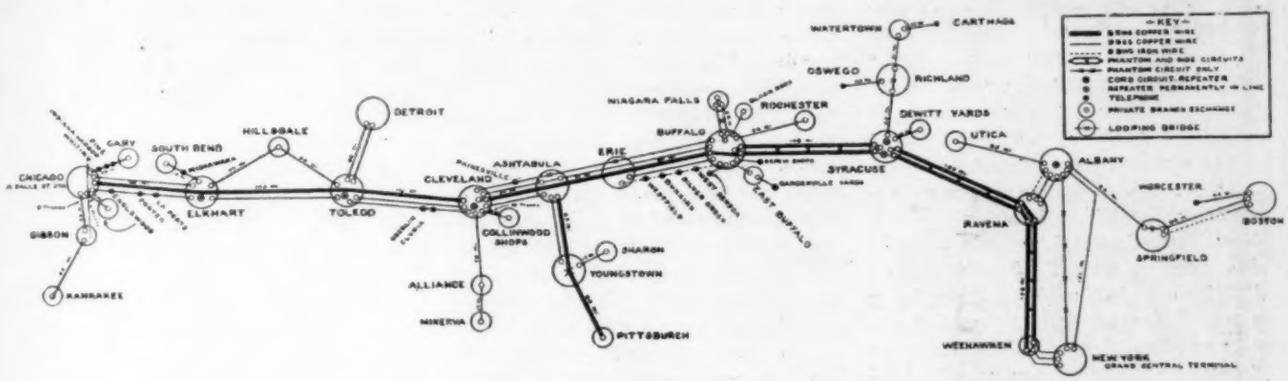

Fig. 1.—New York Central Long Distance Telephone Lines.

the way stations in general do not have access to the long-distance lines.

Direct through service is maintained between the important centers and in nearly every case between adjacent division terminals. For example, New York has a direct Cincinnati wire, also one each to Chicago, Detroit, Cleveland, Buffalo, Rochester, Syracuse, Watertown, Corning, Albany and Boston. Single Morse has the greater total mileage, duplex Morse next, but only a small amount of quadruplex is used because of its limitations.

The thirty New York Central Lines relay telegraph offices handle about 55,000 railroad telegraph messages per day. No attempt is made to count the messages handled by one way station with another, unless they are relayed or sent or received by the general or relay telegraph offices. The way-station operators receive and transmit Western Union commercial messages in addition to the railroad messages.

Some printing telegraph service is employed between relay offices. At present this is limited to New York to Albany and Cleveland to Toledo. The operation is duplex, single channel, Morkrum type in both cases. In the hand operation, single, duplex and quadruplex service is employed.

TRAIN DISPATCHING AND WAY-STATION MESSAGES BY TELEPHONE.

The telephone is used almost exclusively for train dispatching on the New York Central Lines, consisting of 108 circuits, with 3,020 selectors on 10,271 miles of railroad. It is also being extended for way-station message service on dispatching divisions, but is at present in use on 48 circuits with 1,464 selectors, less than half the total New York Central Lines mileage. When business returns to normal it is expected that this service will rapidly extend until the railroad is on a complete telephone basis. Several different types of selectors and telephones are in use for these dispatching and message circuits.

Two railroad automatic telephone systems are in service, one at Detroit and one at New York in the electric division, neither of which is connected to the Bell telephone system. The New York installation comprises five interconnected exchanges, with 600 stations. The system centers in Grand Central Terminal but has exchanges connected by trunks at West 72d St., Mott Haven, Harmon and White Plains. The latter two are each about 30 miles from New York. An immense volume of traffic is handled on this system. The Grand Central Terminal board handles about 2,000 local calls per day, 500 incoming trunk calls, and 700 outgoing to and through Mott Haven. The high hourly load is between 3 and 4 p. m., during which period about 600 local calls are handled daily.

The privately owned telephone cable plant is gradually extending. It now extends nearly 20 miles out of New York on both the Hudson and Harlem Divisions, and will extend eventually 30 miles on each. In other cities the private cable plant is growing in proportion. In the New York territory loud-speaking telephones are used for train dispatching, also for train announcing between interlocking towers in the vicinity of Grand Central Terminal. "A" tower on the upper level of Grand Central Terminal has in use almost all practicable methods of wire communication, including, Bell and automatic telephones, telautograph, loud-speaking telephone circuits, lamp signal annunciators, bell annunciators, private line telephones, and selector telephone train dispatching and message lines. Private-line telephone connection is provided between ticket sellers at the stations in the larger cities and the Pullman reservation departments in the same cities over which reservations are handled. The telephone system is specially designed for this service. Some lines are provided from the reservation desk to the regular telephone switchboard. Special boards or tables are provided for passenger train information at the larger terminals, connecting with the regular telephone switchboard, as well as direct to the Bell city exchange.

MAINTENANCE AND CONSTRUCTION OF INSIDE AND OUTSIDE PLANT.

The construction and maintenance of the pole lines, except some private line and cable, is under the supervision of the telegraph department in accordance with the contract with the Western Union Telegraph Company and under the specifications of the latter after approval by the railroad. The installation and maintenance of the inside telephone plant is under the supervision of the telegraph department and is performed under the railroad's own plans and specifications. The telephone companies install and maintain the rented telephones and switchboards. The inside telegraph plant is installed and maintained by the railroad chiefly under Western Union Telegraph Company specifications under the contract between the two companies.

The pole line is the backbone of the telegraph and telephone plant. Railroad pole-line construction in the past has been very largely based on the average-strength plan, which for a given load of wires provides that the class of poles shall be the same regardless of the extent of the exposure to ice and wind. No estimate is available to indicate how much of the average-strength type of line is too weak, too strong or just strong enough. Lines that are stronger than necessary have cost the railroads more than was warranted for their construction, while those that are too weak will require large expenditures for maintenance, particularly after severe storms when stretches may be laid flat. Additional losses result from service interruption. Such interruptions not only consist of the loss of wire service, with the consequent train delays, but may result in a blockade when poles fall across main tracks, as has happened frequently.

In order to reduce the pole-line damage and traffic interruptions to a minimum, railroad telegraph and telephone engineers have worked out an exact strength of line with an allowable factor of safety based on wind and ice data for the localities in which the lines are located or are to be built for use in construction and reconstruction work. Wind and ice data may be determined readily in any locality so that railroads can construct lines on an exact strength of line basis with a proper factor of safety which should result in economy.

The reconstruction of pole lines along the New York Central Railroad is now

Fig. 2.—Way-Station Installation.

being handled on this basis. The desirable line consists of a cable and not more than two arms of open wires.

The type of telephone and telegraph installation now approved for way offices includes a metal box unit containing electrical protection, cross connections and terminal blocks; metal box units with porcelain panels and very substantial jacks, for patching and testing circuits; factory made cables; caustic soda primary battery common to transmitter and selector bells, and conveniently located table apparatus. Such an office is shown in the two views of Fig. 2, in which the door of the metal box containing the electrical protection is open.

The wire testing is performed by an organization of railroad wire chiefs, each testing office having about one operating division to supervise, which is, roughly, 150 miles of railroad. Many of these points have three "tricks," that is, a wire chief is on duty at all times. Others have but two men per day and some have but one. Wheatstone bridge testing methods are used; also the voltmeter and milliammeter. The station linemen maintain both pole lines and station equipment on most of the New York Central Lines.

Problems arising from the construction, maintenance and operation of the railroad telegraph and telephone plant include electrical protection, inductive interference, electrolysis and telephone and telegraph transmission and traffic. Investigations and experimental work are continually necessary in various phases of the engineering. The oscillograph of the electrical engineering school of Purdue University has been available for about five years in these investigations, the major part of which has been made on actual working lines.

RAILROAD SIMULTANEOUS TELEPHONY AND TELEGRAPHY.

The railroad makes use of simultaneous telephony and telegraphy on practically all its wires, including station-to-station block telephone circuits, train dispatching circuits, message telephone circuits and long-distance lines. The station-to-station block telephone simplex is illustrated in Fig. 3, which indicates "single" Morse on the simplex, but this type of circuit is very successfully duplexed and has been quadruplexed with good results in some cases. This block telephone circuit is very seldom used in a phantom, because there is but one such circuit on any one pole line and this is looped in and out of every office, and, further, being iron wire in nearly all cases, it would not give transmission up to the required standard, for the distances phantoms are required to cover in railroad service.

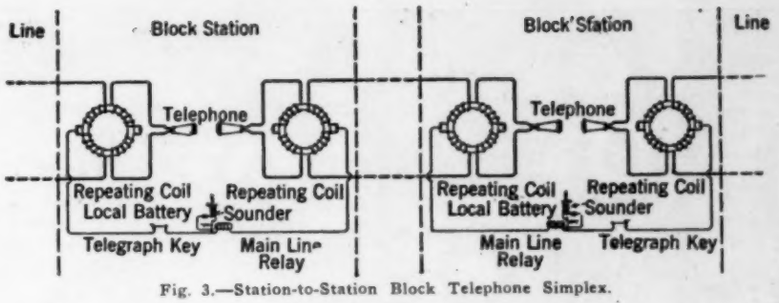

Fig. 3.—Station-to-Station Block Telephone Simplex.

Dispatching and message telephone circuits are like Fig. 4 in general, if direct-current impulse selectors are used. This figure indicates the added resistance that is necessary with the simplex coils to prevent the coils short-circuiting the direct-current impulses which operate the telephone selectors. A phantom composited is shown such as are made up from dispatchers and message circuits on one railroad division. This figure, without the composite equipment and without the condensers around the added resistance in the simplex coil bridges, illustrates an ordinary high-resistance simplex. Straight Morse is shown, but these are often duplexed in the service of the larger railroads to get better service in weather that would reduce the margin of a single Morse circuit to an unsatisfactory degree. The dispatchers and message telephone circuits on each division with few exceptions are paired into a phantom by proper transpositions, and composited. In recent high-resistance phantom installations two separate repeating coils are used on each circuit at each end, one for the telephone tap and the other for the telegraph. The No. 5-AA retardation coil combines the two separate Morse leg coils in one unit, and likewise combines the shunt retardation coils in one unit, each unit having two separate and distinct magnetic circuits with but one cover and base. If alternating-current selectors, which are alternate positive and negative impulse selectors, are used, a repeating coil scheme of sending the impulses can be employed, in which case the same coil is used for the Morse and phantom connection to the physical pairs as indicated in Fig. 5. This gives a low-resistance simplex, generally 1,000 ohms or more below the ordinary "high-resistance" simplex of Fig. 4, assuming 150-mile lines of No. 9 A. W. G. copper wire. The composite ringer is used for signaling between the terminals on phantom circuits, which are composited.

Long-distance telephone lines are simplexed if the transmission losses incident to the use of composite apparatus are prohibitive; also, if there are any intermediate telephones, or if there is no need of additional telegraph service. The railroads generally have no spare telegraph facilities and can use all they can get. The simplex can be single, duplex, or quadruplex. Two such circuits can be made up into a phantom without simplexing or compositing. This is frequently done in railroad service for trunk lines between outlying private branch exchanges and the main branch exchange. In some cases repeating coils are inserted in the phantom drop circuit and a Morse circuit connected to the middle of the line side, thus making a four-wire simplex telegraph circuit. This, in some cases, is done instead of compositing the phantom which would give two Morse circuits, in order to obviate composite ringers; in other cases it is to get more copper in the Morse circuit, for example when No. 19 A. W. G. cable conductors are used in trunks between offices in metropolitan districts.

If no intermediate stations are required on a long-distance line, and the transmission volume is ample, the two wires of the pair are composited with which composite ringers are used and with Morse legs carrying either single or duplex telegraph. Two of these long-distance composited pairs can be phantomed if properly transposed.

Single wires for telegraph purposes only, are almost a thing of the past for railroad service along some of the large railroads. This is because of the economy in using all available wires for simultaneous telegraphy and telephony. Before the advent of telephone train dispatching there were very few long-distance telephone circuits. The New York-Chicago, New York Central No. 8 B. W. G. copper pair which was strung in 1904 was a notable exception. The division service on many trunk lines consisted of one iron Morse train wire, one iron message wire, and very rarely, an iron wire for station-to-station grounded telegraph block circuit. When a telephone dispatching copper pair was strung, the old train wire and message wire were generally paired and made into a station-to-station block telephone circuit and simplexed for the way-station Morse message wire. The addition of a message telephone copper pair at a later

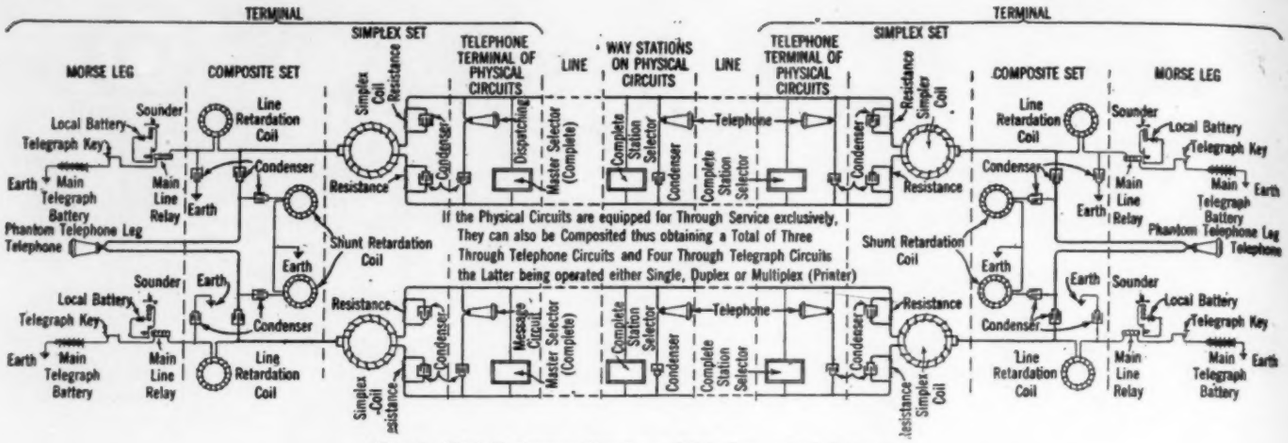

Fig. 4—High-Resistance Simplexes With Composited Phantom.

date completed the division service and provided a long-distance phantom circuit which was generally as much needed as the way-station message telephone pair. This leaves many divisions with no single wire—nothing but pairs, simplexed or composited for telegraph.

A phantom made up of one composed pair and one dispatching circuit was developed by the railroad for a specal situation between Indianapolis and Cincinnati, which points were connected for long-distance service by one No. 8 B. W. G. iron composited long-distance line and one No. 9 A. W. G. copper phantom, the latter consisting of the dispatching and message circuits. The phantom gave much better transmission, and because calls for the same party were first on the iron circuit and next on the copper, it resulted in complaints, some officials thinking the "connection was poor," when they were talking on the iron circuit. It was found that no circuit diagram was available for a combination of a composited pair and a simplexed pair for a phantom, and it was necessary to develop one by experiment. The result is shown in Fig. 6, which indicates that each side of the dispatching telephone line is treated as a composited wire; that is, there is one-half of a No. 5-A A retard coil in each wire. This was found necessary to give a quiet phantom terminal set. This type of circuit gave almost as good a phantom circuit as Fig. 4. The two retard coils in each end of the simplex did not reduce the speed of Morse service, because but half the telegraph current went through each. The capacity to ground on each side of the set at the retard coils was made three microfarads on the simplex and six microfarads on the composite. The equipment on the office side of the No. 5-A A coils has no effect on the circuit as far as phantom noise is concerned, which permits of the three microfarads on one circuit and six microfarads on the other.

EXTRA HIGH IMPEDANCE TELEPHONES.

In arranging for the simplex-composite phantom, it was necessary to use the iron wire circuit as a way-station message telephone circuit, and use the copper pair formerly in this way-station service, as the composited pair of the phantom. This would not have been possible but for a recent advance in telephone transmission which resulted from the use of extra high impedance telephones. The improvement in telephones was the result of experiments made necessary by the emergency use of a 100-mile No. 8 B. W. G. iron wire circuit as a dispatching circuit, in order to divide two dispatching districts into three parts for handling unusually heavy freight traffic that existed just previous to the entrance of the United States into the war. No means of calling stations was provided on this circuit, so that all stations continuously listened in. There were 30 of them, and the resultant "listening" losses were so great that stations at one end of the line could not hear those at the other end. This gave the clew to the cause of other transmission troubles, which were that at certain periods of the day, transmission on dispatching circuits was excellent and at other periods it was very poor. The evidence now is plain that in the evening hours, when the transmission was poor, many operators were listening in. At other times, particularly in the morning hours, transmission was good because the operators were busy with other duties and had the receivers on the hooks.

The outcome of the investigation was the use of 1500-ohm receivers with a retard coil permanently in series as shown in Fig. 7. It was found that with these sets, all stations on the 100-mile iron wire circuit could listen in

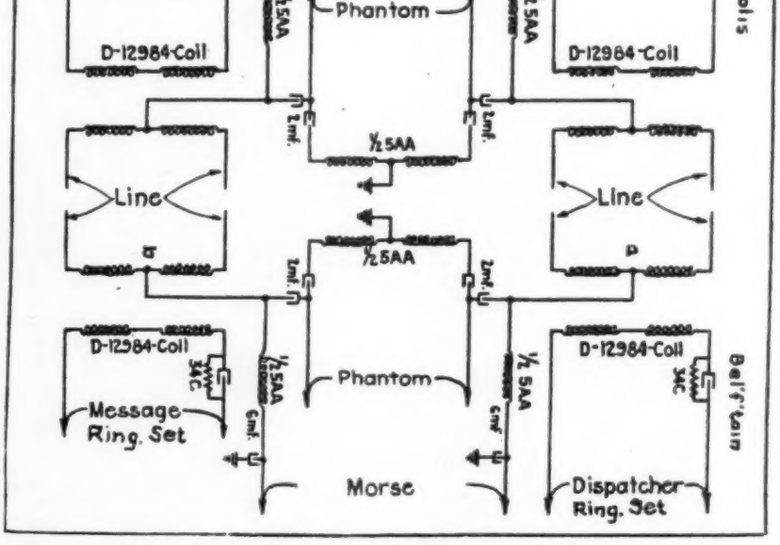

Fig. 5.—Low-Resistance Simplexes With Composited Phantom.

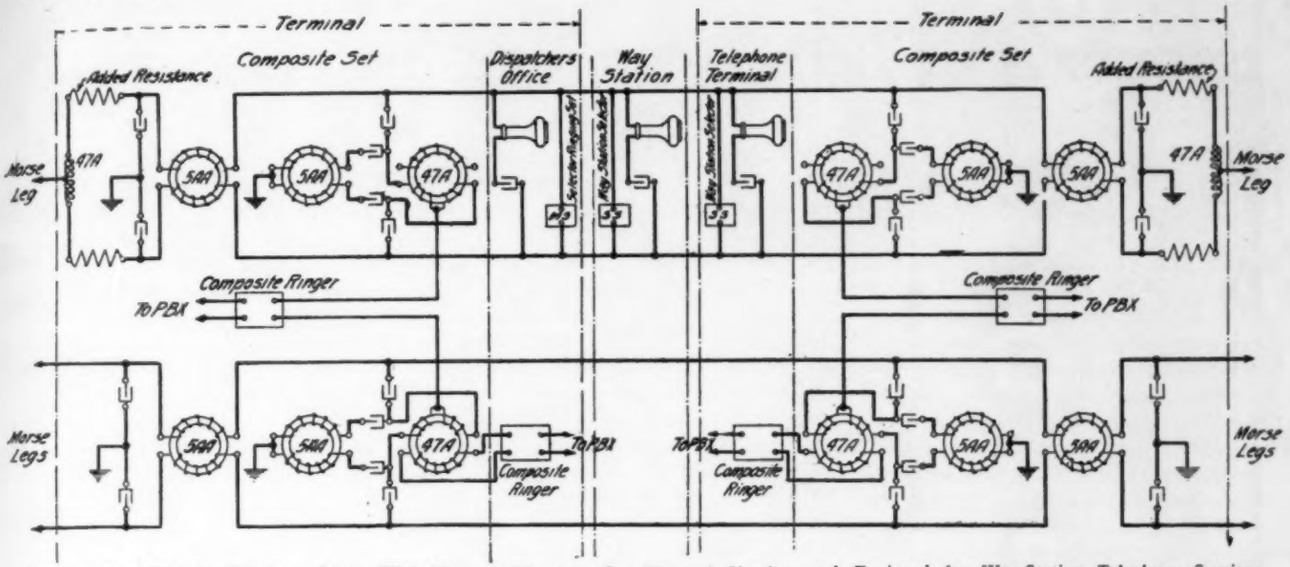

Fig. 6.—Two Metallic Telephone Lines, With Through Phantom, One Physical Simplex, and Equipped for Way-Station Telephone Service; Other Composited Through Telephone Line.

simultaneonsly without noticeable diminution of transmission. The results on dispatching copper circuits, especially the ones with a large number of stations, were likewise gratifying. Some of these dispatching circuits have 60 to 65 stations, whereas the average over the country is but 30, and the telephones previously in use, with 650-ohm receivers, were designed for a maximum of about 15 receivers off the hook at once. The 1500-ohm receiver is equally effective on the Wray-Cummings "booster" telephone, which also

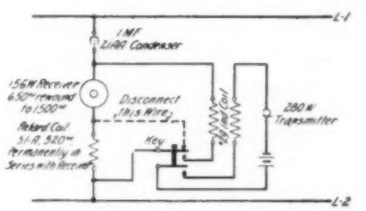

Fig. 7.—295-AK and 300-W Subsets Converted to Extra High Impedance Telephone by Use of 1500-Ohm Receiver.

has a retard coil permanently in series with the receiver. The Western Electric Co. had developed an extra high impedance set with a repating coil and 70-ohm receiver, which was about ready to put on the market and which was put out very shortly thereafter. This gives the benefit of high impedance when in the listening position and also insulates the telephone from the line. In this set the repeating coil is not disconnected from the line by the hookswitch but is permanently connected across the line.

(To Be Continued)

Mackay Companies Show Long Distance Increase

Clarence H. Mackay, president of the Mackay Companies, in the annual report to shareholders, says: "Particular attention has been paid to the continued operation of your long distance **telephone service** operating principally in the South, Southwest and in the Pacific coast. There are 154 cities and towns now reached by that service, and approximately 40,000 miles of wire are utilized and provided for use. The giving of a long distance telephone service by our land line system does not require the stringing of new wires, but is conducted over wires which simultaneously carry telegraph and telephone traffic, thus creating a by-product from our present facilities. This of course, makes the investment nominal and enables us to give the service at rates lower than those charged by other telephone companies.

"We are receiving constant evidence of appreciation of the public at the points where this long distance telephone service is given, and the increase in revenue from that service in 1920 was approximately 35 percent over that of the previous year. The value to your land line system of the extension of this long distance telephone service is very great and in order that that branch of the business may be properly fostered a special department has been created to have particular charge of its development. Great possibilities are seen not only for developing a country-wide long distance telephone business with a practically nominal investment, but also for its collateral effect on our telegraph business, which it is proposed gradually to extend to all important centers in the United States, including New York City.

"It is now sixteen years since the outstanding common shares have been increased and fourteen years since the outstanding preferred shares have been increased. The income of the subordinate companies of The Mackay Companies is greater than is required to pay the dividends of The Mackay Companies, but its policy is to obtain from those companies only sufficient funds to meet dividends. All surplus earnings are left in the treasuries of the subordinate companies for extensions and the development of the business and the increase of reserves."

Lead World in Telephones

The telephone is an American invention, and we Americans have learned to use it better than any other people. Four-fifths of the world's telephones are in the United States. No other country has the exchange system developed to give such convenient service. In some of the most prosperous European countries the exchange system is so cumbersome that it usually requires ten or fifteen minutes to get a connection.

The telephone in this country has expedited the transaction of business. Without our efficient telephone service, the work of most of our great industries would be slowed up and made more expensive. No other country has a rural system that compares with ours. The telephone has definitely affected and molded our business methods and our social and domestic life.

Summary of Bell Telephone System Annual Report

Centralized Control Effects Savings—Improvements in Service - Half Million Pay Stations' Increase—Stock Distribution

WHAT has made the standards of the Bell Telephone System in instruments, apparatus and methods standard the world over, and what has given to the United States the cheapest, best and most widely utilized telephone service in the world, is clearly epitomized by President H. B. Thayer in the annual report of the American Telephone & Telegraph Company recently issued.

The facts presented are of direct interest to the millions of subscribers as well as to the 140,000 stockholders, for they forecast a continuing policy of service and business stability.

LARGE SAVINGS RESULTING FROM CENTRAL CONTROL.

It is shown that the organization structure of the Bell System has been the means of saving hundreds of millions in first cost of telephone plant and tens of millions in annual cost of operating, besides protecting the service from excessive profits that might otherwise be exacted by manufacturers, promoters of patents and others.

In calling attention to these and other savings, which have resulted from the functioning of the Bell organization, Mr. Thayer shows how the Bell System grew along the only lines possible for a nation-wide utility operating under state laws. The founders of the business saw the logical and inevitable need of many operating companies, with a nation-wide outlook and control provided by a central organization co-ordinating the local operating companies. They planned the business structure for the nation-wide utility which the company has become, and without which a nation-wide system could not have been achieved. Within ten years of the first public exhibition of the telephone, the working organization of the business had taken substantially the form which it has today.

LICENSE CONTRACT THE "BACKBONE OF THE BELL SYSTEM."

Mr. Thayer describes the license contract, which governs the relationship of the associated companies and the parent company, as "the backbone of the Bell System." It is shown that although the value to the associated companies of the varied and indispensable services rendered by the parent company cannot all be accurately determined, there are some values which can easily be approximated. As an example, the report cites the use of patents, owned by the American Telephone & Telegraph Co., of which the use to the associated companies is exclusive, which saved over $19,000,000 in cost of plant construction in 1920, and, in use of plant previously constructed, saved over $20,000,000 in annual charges in 1920.

It is estimated that because of the services rendered the associated companies under the license contract, which services no separate company could perform for itself, they are enabled to furnish telephone service at rates at least 25 percent less than would otherwise be possible. "Because the Bell System is a single, nation-wide system, and because the services are general services in the direction of efficiency and economy resulting in the possibility of lower rates, the apportionment of charges by a percentage upon revenue (4½ percent) seems to be a logical one."

STOCKHOLDERS' EQUITY $200 PER SHARE.

It is shown that although the dividends are paid on a par value of $100, there is much more than $100 earning that dividend. The amount paid into the company's treasury for stock exceeds the capitalization by $36,000,000. Because of the earnings on this sum and of other earnings left with the company, surplus and reserves of $154,000,000, $35 per share, have accumulated. Most of this capital and surplus is invested in stocks of the associated companies, many of which have at times left all or part of their earnings in the business. The interest of the American Telephone & Telegraph Co. in the amount so accumulated is equivalent to $67 per share of its own capital stock. This amount added to its own surplus and reserves ($35 per share) makes over $200 in assets to earn the dividend upon each $100 par value of its stock.

LARGER EARNINGS NEEDED TO ATTRACT CAPITAL.

It is emphasized that, for rate-making purposes, the value of the property itself and not the issued capital should be the basis of fixing the amount of the return, or else conservatve capitalization is penalized and a premium put upon over-capitalization and stock watering. Mr. Thayer points out that the market value of money at the present time establishes 8 or 10 percent as a fair return on the value of the investment, and that a return of 8 percent on the investment of the associated companies as a whole would warrant 10 percent dividends because the companies' assets so far exceed their capital stock. At present, none of the associated companies pays more than 8 percent dividends. He shows that if reasonably fair earnings are made possible for the associated companies, the American Telephone & Telegraph Co., which largely represents the investing public's ownership in the telephone business, would make the larger earnings which now are necessary to attract new capital at reasonable cost, and which would more nearly approximate a fair return on its own investment.

"It is clear," says Mr. Thayer, "that this company is entitled to considerably higher earnings without being subject to the criticism of earning more than a fair return. To give an adequate and economical service, our earnings should be large enough and stable enough to attract money freely to our securities and to our stock. We believe that it is for the real benefit of the public we serve that earnings should be nearer to a fair return on the investment than they have been. The interest of the public requires that our stock always be a very high-grade investment, and that the return upon it should be always enough to make it attractive at a premium, with margin enough to insure stability."

The report states that the company's main program for the year was to bring telephone service uniformly up to standard, to bring wages up to standards that would attract and hold "a skilled, loyal and hopeful army of employes," and to increase the revenue to an amount nearer to that justified by the investment of the stockholders.

MORE HELP FOR COMMISSIONS.

In commenting upon the upward revisions of rates that state commissions permitted many of the operating companies to make in order to meet the increased demands for telephone service, the report states that in practically every case there was little or no opposition on the part of the public to the increase granted. This is taken as evi-

dence of the general realization that good and adequate service is a matter of first importance, and that giving needed relief to utilities has public support. The report recommends that in order to keep the commissions constantly informed as to the requirements of the public and the problems of the utilities, and to enable them to act more promptly on rate questions, they should be provided with additional clerical and technical help.

Large Increase in Patent Rights.

The patent holdings of the Bell System increased during the year by rights under more than a thousand patents and applications for patents. It now owns or controls, or is licensed under, more than six thousand letters patent of the United States and applications therefor.

Service to Be Better Than Ever in 1921.

Gratification is expressed that the great effort made to restore the service where it still suffered from the after effects of the war has met with success. Intensive methods of training and operation together with the effective and loyal work of the traffic forces made it possible to bring back the service to a substantially normal condition. "There are good reasons to believe," says Mr. Thayer, "that our continued efforts will result in further improvement in the service, and that during the year 1921 the Bell System will give the best and most uniform service it has ever given.

Mention is made of the certificate of merit awarded to the company by the War Department for services in connection with the war. The citation which accompanied the certificate is called "particularly gratifying" in that it recognized the success of the company's "efforts to keep up the standard of public service notwithstanding the sacrifices made for the benefit of the military service," and is quoted in full.

Cordial Relations Between Employes

The morale of the personnel improved so steadily during the year that it now surpasses in many cases the highest of any pre-war standard. Mr. Thayer says: "Never have the relations between the management and the employes been more cordial or based upon better mutual understanding."

The total amount of payments under the employes' benefit plan for pensions, sickness, accident and death benefits during 1920, the eighth year of the plans' operation, was $3,838,797.

Progress in Development and Research.

A year of unusual activity and accomplishment is reported for the department of development and research, in which some 2,800 employes have been occupied with over 2,500 research and development projects, calculated to improve the service rendered by the associated companies of the Bell System or to make the service more economical. During the year over 1,000 patents to telephony and telegraphy were acquired or applied for as a result of the department's investigations. The report also announces continued progress in reaching a solution of the difficult problem of attaining privacy in radio telephone transmission.

Announcement is made that telephone conversation between New York and San Francisco can now be carried on as satisfactorily as between such points as New York and Boston, due to new methods of improving transmission over the longest telephone wires.

In Memory of Theodore Newton Vail.

At the recent annual meeting of the directors of the American Telephone and Telegraph Company the following resolution was passed:

Whereas, death has taken from us our beloved chief, Theodore Newton Vail, twice president and lately chairman of our board,

Resolved: That we, the directors of the American Telephone & Telegraph Company, spread upon our records this acknowledgement of our indebtedness to him:

He has left our great company stronger and more useful than ever before.

He has given us this organization as an instrument of public service.

He has given us an outlook upon the wide fields of further scientific discovery.

He has given us a part in the conquest of time and space.

He has given us courage in seasons of stress and trial.

He has given us new ideals of business conduct.

He has given us a high mark for our ambition.

He has given us an example of the force that lies in honesty, fairness, patience and industry.

He has given to all of us his friendship, sympathy and wholehearted affection.

He sought fellowship, knowledge and accomplishment, and in that quest he won universal respect.

He has played an historic part in the progress of civilization.

He has brought the world in closer contact for the betterment of mankind.

His associates are able and proud to bear testimony that his chief ambition, to so lay the foundations that the work would live after him, has been abundantly realized, and that in the memory of his achievements his successors for all time will find their most impelling inspiration.

Net Increase of 563,430 Stations in 1920.

Demands by the public for additional telephone service necessitated a large construction program, the execution of which during the greater part of the year was rendered difficult by the abnormal industrial conditions of the post-war period. In spite of these difficulties, the Bell System constructed the necessary plant and installed a net increase of 563,430 stations, which is the largest number of stations ever added by construction to the system in any one year. The plant has been maintained up to the usual high standards of the system, reconstruction having been done as needed, and is in good condition.

Work is progressing rapidly on the Havana-Key West cable, in co-operation with the Cuban Telephone Company, and service between Cuba and the United States is expected to be established very soon.

Facts About the Bell System.

At the end of the year the number of telephone stations constituting the Bell System in the United States was 12,601,935, of which 8,333,979 were owned by associated companies of the Bell System. The increase in the total number of stations in the Bell System during 1920 amounted to 806,188. The daily average of exchange and toll connections during 1920 was 33,162,000, an increase of 2,700,000 over the daily average during 1919.

There were 231,316 employes in the Associated Bell Companies at the close of the year. The wire mileage totaled 25,377,404, of which 95.1 percent was copper. The percentage of Bell-owned wire in underground cable, exclusive of submarine cable, was 61.8. The underground plant, including cables and conduits, represented a cost of $307,800,000. The net additions to the Bell-owned plant during the year was $147,882,100, an increase of $74,436,100 over the additions made during 1919.

Surplus Earnings $7,785,486 for Bell System.

For the whole Bell System, with all duplications excluded, the total gross income for the year was $85,264,976, from which over $37,000,000 was paid in interest, rent and miscellaneous deductions from income, and approximately $40,000,000 in dividends. The surplus earnings for the year were $7,785,486.

The capital stock, bonds and notes payable of the Bell System outstanding

in the hands of the public at the close of the year 1920 were $1,107,417,623, while the book cost of the net assets devoted to earning a return on these outstanding securities amounted to over $1,551,000,000. Actual appraisals of the telephone plant in the Bell System made by regulatory bodies for rate-fixing purposes show that the true value of Bell System property greatly exceeds this book cost.

Dividend Rate 8 Percent for Past Fourteen Years.

For the American Telephone & Telegraph Company the net earnings of the year, after payment of interest and fixed charges, but before dividends, were $51,821,215.66. Dividends at the usual rate of $8 per share per year amounted to $35,376,792.88. Of the resulting balance, $8,000,000 was appropriated to reserve for contingencies, and $8,444,422.78 was carried to the surplus account. The earnings of the American Telephone & Telegraph Company for 1920 include, in addition to the earnings of the long-distance lines, dividends on the company's investment in stocks of its associated companies, interest on bonds and notes of and advances to associated companies, interest and dividends from investments in other companies, earnings under the general service contracts with associated and other companies for the furnishing of instruments and services, and other miscellaneous revenues.

Due to the delay in the granting of rate increases several of the companies earned their dividends only in part, and at the end of the year some applications for increased rates were still pending (New York City is a notable case), but with the adjustments fully in effect in the majority of cases the rate of earned return on the companies' investment as a whole is substantially better than the average rate of the year.

The company and its predecessors have paid dividends to the public at the rate of at least $7.50 per share for the past 39 years, and during the past 14 years the rate has been uniformly $8 per share.

The number of shareholders in the American Telephone & Telegraph Company on Dec. 31, 1920, was 139,448, an increase of 18,988 during the year. To this number should be added some 20,000 employes of the Bell System, who are paying for stock at the rate of a few dollars per month. Approximately 23,000 other employes are already stockholders of record.

Has Widest Stock Distribution.

Of all American corporations the American Telephone & Telegraph Company is third in the amount of stock outstanding, and is first in the number of holders of common stock, and has the widest distribution of ownership of any corporation. Of the 139,448 stockholders at the close of the year, 130,407 held less than 100 shares each; 8,741 held from 100 to 1,000 shares each; 274 held from 1,000 to 5,000 shares each; and 13 held 5,000 shares or more each (omitting brokers, holders in investment trusts, etc.) Of the holders of less than 100 shares each, 109,080 held 25 shares or less each, and 52,055 held five shares or less each. The average number of shares held was 32. There are more women shareholders than men. These shareholders reside in all parts of the country, and their investment has been applied to the building and extension of telephone plants in every section of the United States.

The Telephone Situation Today

New Developments in Raw Material, Apparatus and Supplies Brought About by Present Day Conditions

By W. N. FURTHMAN.

THE original patent of loading coils for loading a telephone circuit, which is the basic claim in this patent, expired in 1920. While there have been other patents issued on loading coils since the year 1900 they have consisted chiefly of minor improvements in design from a manufacturing standpoint only, and do not, therefore, in any way prolong or extend the principal claims on loading coils which have fully expired.

One of the principal changes that was made in one of the later patents consisted primarily in the slotting of the core of the coil. The object of the slotting of the core of the coil was to prevent the coil from being magnetized in service as the flow of any direct current of more than 0.15 amperes would magnetize the coil. In connection with this change in the design of the coils, it is interesting to note upon referring to Professor Pupin's original patent papers that the drawing in his papers shows that in 1900 he contemplated the use of a slotted core in his invention.

Several patents have been issued which cover the use of a phantom loading coil in a telephone circuit. While Professor Pupin's original patent issued in 1900 does not specifically emphasize the use of his coils in any particular circuit, patent experts are of the opinion that, since phantom circuits were in use previous to the issuance of his patent, his invention of 1900 was intended to cover the broad claim of the use of a loading coil in a telephone circuit, and that such a claim covers the use of this coil in either side or phantom circuits. Several large manufacturers have had their patent experts investigate the patent situation in regard to loading coils and have received the opinion that all of the principal patents in connection with the loading of a telephone circuit have expired. In considering the manufacture of loading coils they have applied these decisions to aerial as well as cable loading coils.

In considering the manufacture of loading coils these large manufacturers have determined that during the war they could have made loading coils at a price of $30. Due to the material decrease in raw materials that has taken place since that time, a fair price for this apparatus would be $25 each.

Loading coils both of the aerial and cable type have been used very extensively in Germany and England under licenses of the Pupin patent. It is interesting to note in this connection that the design of an efficient Barretter has enabled the government officials in England to obtain satisfactory results by using what is known as the medium heavy loading coils in aerial circuits at a spacing of every 12 miles. When it is noted that a larger and more expensive aerial coil is used in this country at a spacing of from every 6 to 8 miles, it will be evident that a very material saving in the expense of loading an aerial circuit could be effected, providing the insulation resistance of the circuit is sufficiently high. In the United States it is the practice to use the heavy type of loading coil cable circuits 1.25-mile spacing. The use of a Barretter in this connection has also determined that very satisfactory transmission can be obtained in a cable with medium heavy loading coils at a spacing of 2.5 miles each.

There has been considerable discussion in connection with the use of

loading coils, covering the necessity of installing what have been termed terminal transformers. It was originally contended in the design of a loading circuit that the wave form of an aerial line circuit required loading coils of a different time constant than those which were used in the loading of a cable circuit. Because of this fact terminal transformers were considered necessary, not only between loaded cable and loaded aerial circuits but also at the toll stations through which either the aerial or loaded cable circuit entered or extended from the exchange. The use of these terminal transformers was tried out, but owing to the fact that they brought about either a large amount of cross-talk in the cable or aerial circuit, or high transmission losses, and that it was exceedingly difficult to design an efficient terminal transformer that was practical in two-way circuit operation, they have been entirely abandoned. It is the present practice to specify that where loaded cable circuits join loaded aerial circuits, half-length spacing shall be used in each loading circuit before the junction is made, and to adopt a similar practice for either aerial or cable loaded circuits leaving or extending from an exchange.

The development of a cross-talk meter and bridge and also of the simple, efficient Barretter have materially reduced installation expense of loaded coils either in aerial or cable circuits. A large number of tests which were made in the field have been almost entirely eliminated because of the fact that loading coils in both aerial and cable types are now manufactured, which are entirely free of cross-talk either in side or phantom coils.

Transmitter Hand Sets.

In the endeavor to make an efficient hand set from a receiving as well as a sending standpoint, it has been found that these hand sets have a tendency to singing, due to the high efficiency of the transmitter and the sensitiveness of the receiver. The writer has recently determined that about 95 percent of the hand sets which have a tendency to sing can be corrected by placing the receiver coils in such hand sets so that they are equal in resistance, inductance and capacity and also of course from short-circuited turns. In making these tests it was determined that when one coil in the receiver attained greater inductance, such a coil had a tendency to excite a greater pull on the receiver diaphragm than the other coil and when alternating current was produced in the local circuit by vibrating of the transmitter, such alternating current caused the receiver diaphragm to vibrate on a tuning fork principle, thus bringing about the singing of the instrument. The use of a sensitive Barretter determined that by eliminating the singing of the hand sets in this manner no transmission loss was found as compared to a sensitive hand set which was subject to singing.

Fire and Burglar Alarm Circuits.

Recent investigations in several large cities has determined that a considerable profit can be obtained by a telephone company which will advise its customers that it is in a position to furnish fire and burglar alarm service. As a matter of fact, it can be safely stated that fire alarm and burglar alarm business is one of the most valuable by-products, if such a term may be used, in the telephone business. While the Bell companies are not obtaining this business directly they are reaping its benefits through the subsidiary companies with which they are associated in all large cities in the United States. Considerable apparatus has recently been designed that can be located either in a factory or private dwelling that would operate on a telephone principle, thus eliminating expensive apparatus which has heretofore been required for installing either in the factory or private dwelling, in a manner satisfactory for the purpose. Because of this fact business of this kind may be readily secured, not only because of the saving in first cost of installation but in the apparatus which would have to be made for 24-hour service of this kind. The apparatus at the switchboard end is so simple that the ordinary operator would be sufficiently skilled to interpret the signals and to immediately make such connections as would be required to forward such alarms to their proper destination

Ford Magnetos.

A large number of telephone companies in the United States and Canada are using 1-ton Ford trucks for installation and inspection purposes. The writer has recently determined in tests which were made from alternating current obtained from a Ford magneto that the frequency of this magneto is sufficiently high to make many valuable tests in the field which heretofore have only been made in the laboratory, because it was impossible to obtain a source of power that was portable.

An oscillogram of the wave length of this magneto has shown that while there are several high harmonics present, they can be readily reduced by means of a suitable wave filter made of an inductance coil and a condenser properly designed for the purpose, so that the results of the tests which are made can be within a very reasonable degree of accuracy as compared to similar tests made in the most efficient laboratory.

Politeness and the Telephone Girl

We find ourselves in hearty sympathy with the plea of Mr. Earl Goodwin, assistant to the president of the Chesapeake & Potomac Telephone Company, Baltimore, who in an address before the Advertising Club of Maryland spoke upon "Public Psychology." Treatment of the telephone operator was the burden of his speech. We wish that his words were hung in flaming light above the telephones of many who forgetful of ethics, urbanity and proprieties of address, speak roughly to operators whom they never saw. We confess to a lack of patience with those who fly into a tempestuous rage when given a wrong number, or the call receives a delayed response. We can reasonably be assured that no well-instructed telephone operator wishes to embarrass any subscriber, or hamper the good service of the telephone company.

Frequently we have been amazed at the rough treatment "over the phone" accorded a young lady who in her position at the other end of the wire was perhaps clothed with all the graces and virtues of true womanhood. We have discovered women bearing down with unpardonable severity upon the "exchange girl." Some men, if such punishment were obtainable, should never be allowed a telephone in home or office. The decencies of business and society should prevent.

A few weeks ago we were in a certain barber shop. The proprietor desired a certain telephone number. There was some delay. The wrong number was given him. His passion led him immediately into violent language. He lost a customer, for we went from that shop registering a purpose never again to allow a man so vituperative and coarse in language to place a razor upon our face.

We consider the remarks of Mr. Goodwin perfectly sane and to the point. It is true that "often the girl gets angry at such treatment and leaves her position, with the result that the service is just a little worse than before. During the war, he said, many operators left to take positions at war-time wages, and as a result of many new girls being 'broken in' at one time the service became poor. This made the public ill-tempered, and when it started abusing the girls many left. *The Methodist.*

Service and Proper Public Relations

An Address Delivered Before the Recent Meeting of the Southern Indiana Telephone Association at French Lick, Indiana

By HARRY BOGGS
Chief Accountant Public Service Commission of Indiana

WHAT is service? Webster says service is the performance of labor for the benefit of another; the act or means of supplying some general demand; that which promotes interest and happiness; to satisfy.

Some people use the word because it has an euphonious sound, it "listens well," but it really has an empty meaning to them. They think because it proclaims good and looks well in print that it will create a favorable impression and no further efforts are required, while many others, and I am glad to think that their majority is rapidly increasing, recognize the full meaning of the word and are striving with all their ability to fulfill its pledge. Service and proper public relations are twin brothers. They are almost synonymous.

Of course, you are in business primarily for profit and the wise man who serves best usually profits most. If you expect to attain success you must be strong in service.

In its fundamentals the telephone business is purely a commercial industry, just like any other enterprise. You are a merchant engaged in selling your commodity, your wares. You don't sell your patrons your switchboard or space on it. You don't sell him your pole or wires or your instruments. You do not even rent to him any of these facilities. What benefit would any patron derive from the purchase of any of this equipment if the element of service was lacking? It is service you have for sale and it is service that your customers desire to purchase.

Service depends not upon any one piece of equipment or any one individual, but upon the entire organization, and if there is failure at any point, then your service becomes impaired and the entire system is bound to suffer. The mightiest chain is only as strong as its weakest link.

There is a variety of service being furnished by the telephone companies in the different parts of the state today. Good service is not limited to the promptness of the operators in answering the calls, or to clear lines in conversing, but it includes the satisfying of the reasonable demands in all other matters connected with your business, such as a prompt clearance of trouble, settlement of disputed bills, relocating and changing instruments and various other minor matters incident to your particular business. It means to meet the demands of your customers in a satisfactory manner.

Last week I heard an application for an increase in telephone rates, and among the protestants was a wealthy farmer patron who stated that he had hesitated about appearing against the company, as he realized that advances in the prices of material and labor had long since reached a point where he thought the company should have higher rates, but as he had tried a number of times to get the company to move his telephone from one room to another for more than a year without results, he felt compelled to complain about the service he was receiving. He said the operators were fairly active in giving him quick results when he wanted to use the lines, but as he had rebuilt his house, which had left the telephone off in a side room, he became provoked at the company every time he had occasion to use it. This simply illustrates a woeful lack of service. It is a case of when a so-called little thing reacts in a big way against the company.

We are living in an "evolutionary" age. Great advances are being made in all lines of industry. Greater demands are being made on you today than ever before in your history. If you expect to keep pace with progress it is up to you meet those demands. You can adopt either of two paths. One is calmly to sit back and say, "I simply have not the equipment or the capital and will just let things run as best they can," or you can say, "Well, there is only one thing to do and that is to give service and make the charges accordingly." Fortunately, there are so few of the former type of operators that they will soon be outstripped in this industrial race and their places filled by men with more vision than logic.

You are more fortunately situated than the average merchant who sells goods, in that as a rule you have a non-competitive market. Your commodity has become more of a necessity than a luxury. These elements add to the security of your investment, but for the very reason of monopoly the average patron is inclined to be a trifle more suspicious and exacting. Your customers are the common people. Abraham Lincoln said that the Lord must have loved the common people as He had made so many of them. It is they that you deal with. They are human and they like to be considered as individuals. The service which carries with it small courtesies, small attentions, small considerations, if practiced consistently, cannot fail to produce a good feeling and fellowship, resulting in amicable relations and ultimate prosperity.

What are some of the elements which create good service? In the first place, service is not a theory, but a concrete result produced only by carefully planned work throughout your entire organization. This embraces every officer and employe as well as the physical plant. Is your switchboard antiquated and inadequate or is it in first-class shape with waiting capacity? Are your lines hanging on trees, berry bushes and fences, or do they run clear of interferences over good insulation? Are your linemen sitting around discussing the League of Nations, or out shooting trouble, pulling slack, straightening poles, replacing cross-arms or rewiring stations? Are your operators doing fancy work, reading novels, visiting or sleeping in the rest room, or crabbed in answering calls, or are they industrious, polite, prompt and diplomatic? Is the manager stalking around with a "public be damned" attitude and "take it or leave it" air about him, with the old-fashioned idea of the monopolist, or is he one of the prominent men in the community who not only knows the operation of a telephone plant, but who also understands human nature as well, at least to some extent, and who takes his part in the civic affairs of the community wherein he resides and counts his patrons as his friends and not his enemies?

As an illustration of what activity on local civic affairs will do, I might say at this point that the commission had a rate case recently wherein, as in all cases, the subject of service was introduced. Now, it happened that the commission knew the service was not satisfactory, but not one witness would acknowledge the fact. The reason was that the manager devoted much of his time to civic activities. He had been president of the chamber of commerce, was almost always the man to take the lead in every local movement tending to the benefit of his locality, was always a leader in the Red Cross and Liberty

Loan drives, active in the cause of charity, and, like the Presbyterian elder, he belonged to church and played a darned good game of poker.

Good service demands that the physical plant be kept in such a condition that the public will be proud that the company is a part of the community.

Good service means safe and neat installation work that is pleasing to the eye as weil as harmonious to the ear. The patron should feel that he is relieved by the company of every thought, care and effort in making available for his use the process of talking to his friends or transacting his business with those who are out of sight, but not cut off from communication.

First impressions are the most lasting. When a new patron enters your office, his mind is usually free from opinions as to you and your methods. He expects to receive what he wants with celerity and cheerfulness. There is your opportunity to place yourself in the proper light with him. You or your employe who receives him should show real human interest in his welfare. You should welcome questions, you should volunteer all the information possible that may be of interest to him. What to you may seem a most simple proposition may be entirely new to him. Courtesy costs you nothing, yet it is one of the most valuable assets in the world.

Usually when application is received, the service is wanted immediately. If there is any reason why you cannot make the installation at once you should not fail to explain fully why you are unable to do so. If there are prior applications or a lack of material or employes the patron should be told. In other words, promptness in furnishing service is essential, but no promises should be made in order to please the customer for the present, which later cannot be lived up to. Any promise once made should be fulfilled regardless of difficulties or expense. When an application for service is received it is a fitting time for the creation of an atmosphere that will convince your patrons that their money is not all the company wants, nor that the selling of service is its only desire. He should be made to feel the company honestly desires to furnish a service that will not only satisfy, but will please also.

As the various employes are coming in constant contact with the public, the individual patron is naturally inclined to judge the entire organization by his experience with its representatives. It does not cost your trouble man one penny to say a cheerful "good morning" when going into a house, also to wipe his feet. Neither does it cost any money for your operators to say "Thank you" if they ask the calling patron to repeat the number Complaints cannot be handled too carefully, or be too closely investigated. No attempt should be made to stifle them; on the other hand, they should be encouraged, listened to with close attention and the patron made to feel that the company is thankful for the information and glad of the opportunity to remedy any unsatisfactory condition. You need a deep human understanding of your people so that you can more clearly get the viewpoint of each through his eyes, rather than your own. Then your patron will begin to realize that the company has a genuine desire to please and wants his good will quite as much as his money. It becomes more important to please a patron than to take his money. It becomes a venture in human understanding and ultimately it cannot fail to lead to financial success. A pleased patron is the greatest advertisement in the world. It is not a bad idea to make a practice of calling recently connected patrons on the telephone and asking them if everything is all right and if they are getting satisfactory service. In this there is that element of human touch. You are treating your patron as an individual and he feels like he is being given personal consideration.

The average patron is not concerned with the detail work of the serving company. To him good service means getting what he wants with the minimum amount of annoyance as far as he is concerned. He makes his application and pays his bills. Everything between these points should be handled by the company in such a manner that the patron is not required to give the matter of his service any more thought. A good servant is never in the way, but is always on hand when needed.

Courtesy lends to service what the sparkle lends to the diamond and the fragrance to the rose. There is always time for courtesy, but never a moment to spare for discourtesy.

Conciliation is a friend of courtesy and means an honest effort to placate and please those patrons who may be antagonistic. Conciliation requires more thought than courtesy and sometimes means a study of individual necessities. Some one has said: "If you want to win a young fellow, admire his neckties. If you want to win a mature man, ask his advice. If you want to win an old chap, ask him what he eats. To please a young woman, praise her taste in dress. To please a middle-aged woman, praise her taste in dress. If you want to please an elderly woman, praise her taste in dress." At any rate, people like to be pleased and there is a way to please and conciliate everyone.

Half-hearted, grudging, or stinted courtesy is a sham and is soon uncovered. The end and aim of it all is good service and the winning of good will. Many drops of water make a mighty ocean. Many tiny grains of sand make a great desert. Likewise, that intangible, but invaluable thing called "good will" is the result of many little things, each of which in itself may not seem of great importance, but the total of their influence on the public mind affects public opinion for good or for bad.

Good service stimulates business. It stimulates good feeling. It removes antagonism. It crates friends and boosters. It satisfies. You know the difference between results and the consequence is that results are what you expect and consequences are what you get; therefore, the result of good service is the natural consequences of proper public relations.

The company's right to exist comes from the public, and what the public has given it can also take away. Public sentiment controls the ultimate destiny of every public utility and the value of the good will of the public cannot easily be measured, notwithstanding the fact that you are enjoying a monopoly, your service should always be of the same high grade that would exist under strenuous competition. Under constantly improving service the company can ask nothing reasonable from the public which the public will not cheerfully grant.

Take the public into your confidence, treat each patron as an individual and in the same manner that you personally would like to be treated. Make the public know that you are striving to give the best service possible. Take an interest in public affairs and invite the public to take an interest in yours. Then when you are compelled to seek increases or ask any consideration of your patrons, they can say: "It is our company and it is to our interest that such reasonable requests be granted." To some this way may seem an impossible condition to attain, but it is possible and entirely practicable. Such a condition cannot be born in a day, but many days of untiring effort to supply the right kind of service, coupled with the constant thought for the necessities, desires and preference of the individual will eventually bring it about. Such a service cannot fail to win and hold the confidence and good will of your patrons.

Just as long as there is service to be supplied, just so long will there be possibilities for imqroving service.

Alternating Current Measurements

A Practical Summary of Methods Employed in Telephone Line Alternating Current Tests

By C. A. WRIGHT,
Professor of Telephony,
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BREAKS in telephone lines or "opens" cannot be located by a direct current method because there is not a complete circuit for the direct current. There is, however, a complete circuit for varying or alternating current through the "mutual capacity" of the circuit. This capacity may be measured by determining the amount of electric charge on the condenser formed by the two conductors of a telephone line, or a conductor and ground and the dielectric of air or other insulation between them for a given voltage applied to the circuit, or by the Wheatstone Bridge or other methods.

The capacity of a condenser is proportional to the area of its plates, and the inductivity of the dielectric and inversely proportional to the square of the distance between the two conductors. The effective area of the plates in the case of a telephone line is proportional to the length of the line, and depends upon the size and location of the conductors. If a charge of one coulomb (one ampere flowing for one second) collects on the condenser when an electromotive force of one volt is applied to its terminals the condenser has a capacity of one farad.

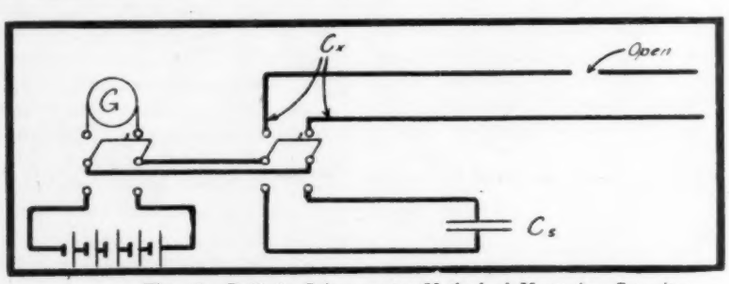


Fig. 13. Ballistic Galvanometer Method of Measuring Capacity.

As the capacity of a telephone line which is open is proportional to the distance from the end at which the measurement is made to the open, this distance may be found by obtaining such a capacity and dividing it by the capacity per mile of the line.

When current flows through a coil of wire, lines of magnetic flux link with the turns of the coil. If the current is increased or decreased, the number of lines of flux increase or decrease. This change in the number of lines of flux linking with the coil induces a voltage in the coil in such a direction as to oppose the change. The induced voltage equals the rate of change of current multiplied by the "self inductance" of the circuit. If when the current changes at the rate of one ampere per second there is induced an electromotive force of one volt in the coil, the coil has a self inductance of one henry. A telephone line has self inductance due to the flux linking with the conductors, when there is a current flowing in the line, and the number of lines of flux linking with the wire, and therefore the self inductance is proportional to the length of the line. Measurements of self inductance may be made on a loaded telephone line, as a check on the condition of the loading coils.

There is mutual inductance between two conductors which are in the same vicinity. When current changing in one conductor at the rate of one ampere per second induces an electromotive force in the other of one volt, the mutual inductance between the two conductors or circuits is one henry. Measurements of mutual inductance of telephone circuits are not generally necessary.

The meters shown in the first article cannot be used to measure alternating currents and voltages. The magnetic field of the permanent magnet is constant in direction. If alternating current were made to pass through the meter the field of the movable coil would alternate in direction, so that the torque between the two fields would reverse at the frequency of the circuit and the needle would vibrate about the zero point of the scale. If the permanent magnet were replaced by an electro-magnet with a core of soft iron, connected in the circuit in such a way that its field would reverse with the current or voltage, and be proportional to them, the torque between the fields of the electro-magnet and the movable coil would be constant in direction and proportional to the square of the current or voltage. The retractile force of the springs increases directly in proportion to the deflection. Because of the inertia of the needle and moving parts, the pointer would take a position corresponding to the average of the instantaneous values of torque, or at a point corresponding to the average square of instantaneous values of current or voltage. Each point of the scale is marked to indicate the value of current or voltage. These meters then, read the "square root of mean square" or effective values of current and voltage.

Galvanometers may be used which are similar to the above meters, except that the moving parts are more delicate. In some cases they are arranged so that the "movable" coil is always in its zero position, the tension of the spring resisting rotation being adjusted to hold the coil in this position. The position of an indicator attached to the end of the spring which is adjusted indicates the current through the coil, or the voltage impressed upon the coil circuit.

A ballistic galvanometer must be used when the ballistic galvanometer method or the loss of charge method of measuring capacity are used. In order that a galvanometer may be used in this way, the moving parts must have enough inertia to permit the complete discharge through the coil of the charge on the condenser before they have moved appreciably, or the period of the galvanometer must be long compared with the time of discharge.

It is frequently convenient to use a direct current galvanometer with a thermo couple. When two wires of different materials are connected to join a circuit, a voltage is set up in the circuit when one junction or couple is raised to a higher temperature than the other. An alternating current passed through such a couple will heat it and a direct current galvanometer connected to its terminals may be used to measure the voltage of the couple.

A telephone receiver is a very sensitive detector of electric currents. It is particularly useful in Wheatstone Bridge circuits where a point of zero, or minimum voltage is to be found, as when the bridge is balanced.

When an alternating voltage of sine wave form is impressed upon a circuit containing series resistance, self induct-

ance, and capacity, the current which flows in the circuit is

$$I = \frac{E}{\sqrt{R^2 + (2\pi fL - \frac{1}{2\pi fC})^2}}, \text{ where}$$

I = the current (amperes)
E = the impressed voltage (volts)
R = the resistance (ohms)

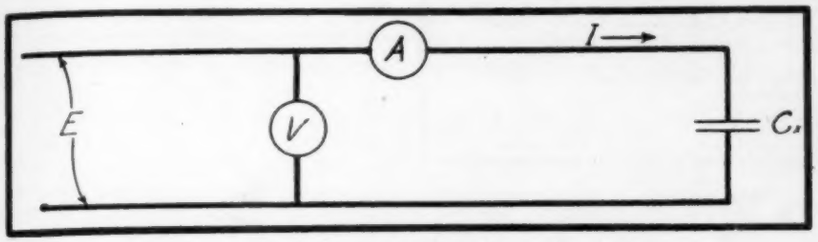


Fig. 14. Ammeter-Voltmeter Method of Measuring Capacity.

L = the self inductance (henrys)
C = the capacity (farads)
The expressions $2\pi fL$ and

$$\frac{1}{2\pi fC}$$

multiplied by the current are the voltages of the inductance and capacity of the circuit.

The most general method of measuring capacity is by directly comparing the capacity under test with a known capacity by means of the ballistic galvanometer method. If the damping of the instrument can be neglected the capacities are to each other as the deflections; when the capacities have been charged from the same voltage. It is better to vary the standard or known capacity, or the charging voltage until the deflections are equal. Then

$$\frac{d_x}{d_s} = \frac{C_x E_x}{C_s E_s} \text{ or } C_x = \frac{C_s E_s d_x}{E_x d_s}$$

If $E_x = E_s$, that is, if the capacities have been charged to the same voltage,

$$C_x = \frac{C_s d_x}{d_s}, \text{ where}$$

d_x and d_s = the deflections obtained on discharge from the test and standard capacities.

C_x and C_s = the test and standard capacities,

E_x and E_s = the voltages to which the test and standard capacities are charged.

In large offices daily routine tests on subscribers' lines are frequently made in this way. A voltmeter similar to the wire chief's (10,000ω to 100,000ω) voltmeter is used. An indication showing that the line and substation set have the proper amount of capacity, with the absence of a steady deflection of the voltmeter which would result if there were crosses or grounds on the line, is a good indication that the line is in good condition. Fig. 13 shows the ballistic galvanometer method of measuring capacity.

In place of the voltmeter, a telephone receiver may be used, the wire chief or tester judging the line capacity from the loudness of the click in the receiver when the line discharges through it.

In the loss of charge method, the capacity is measured by comparing the deflections charged to the test potential, and after it has been charged to the test potential and allowed to discharge for a given time through a high resistance.

Fig. 14 shows the circuit used for measuring capacity by the ammeter-voltmeter method. If a voltage of sine wave form is impressed upon the terminals of a condenser, the current which will flow through the condenser will be

$I = 2\pi fC_x E$, or $C_x = \frac{I}{2\pi fE}$, where

I = current (amperes)

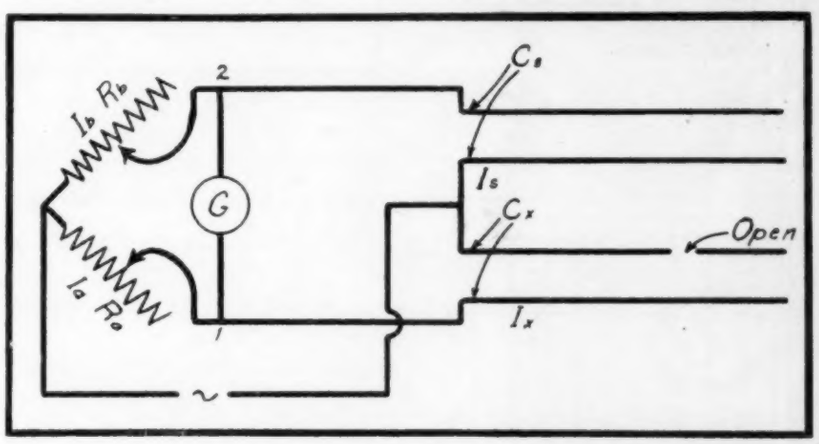


Fig. 15. Wheatstone Bridge Method of Measuring Capacity.

f = frequency (cycles per second)
C_x = capacity (farads)
E = voltage (volts)
If C should be made to represent microfarads,

$$C_x = \frac{I \times 10^6}{2\pi fE}$$

The Wheatstone bridge method of measuring capacity is of greater importance to telephone men than any of the above mentioned methods except the ballistic galvanometer method. A Wheatstone bridge circuit for measuring capacity is shown in Fig. 15. The voltage applied to the bridge is alternating or variable. The detector used may be an alternating current galvanometer, but more generally it is a telephone receiver. An ordinary telephone receiver is not only very rugged, and requires no adjustment, but it is also an extremely sensitive detector. The resistance arms of the bridge should be non-inductive free from capacity. It is best that the order of magnitude of these resistances be the same as that of the impedance of the capacities.

When the resistances are adjusted so that the bridge is balanced—that is, when the galvanometer reading is zero, or when there is no sound, or minimum sound in the telephone receiver,

$$\frac{R_a}{R_b} = \frac{C_s}{C_x}, \text{ or } C_x = \frac{C_s R_b}{R_a}$$

This may be proven for the case where the applied voltage is of sine wave form as follows:

$I_s = I_x$ and $I_b = I_s$ because no current passes through the galvanometer or receiver.

$$I_a R_a = I_b R_b, \text{ and } \frac{I_x}{2\pi fC_x} = \frac{I_s}{2\pi fC}$$

because they are the voltages between common points and points 1 and 2 which are at the same potential. Dividing equals by equals, the quotients are equal,

$$I_a R_a \div \frac{I_x}{2\pi fC_x} = I_b R_b \div \frac{I_s}{2\pi fC_s},$$

$$\text{or } 2\pi fC_x R_a = 2\pi fC_s R_b,$$

$$\text{or } C_x = \frac{C_s R_b}{R_a}$$

It may be proven also that this relation holds for the general case where any varying voltage is applied to the bridge.

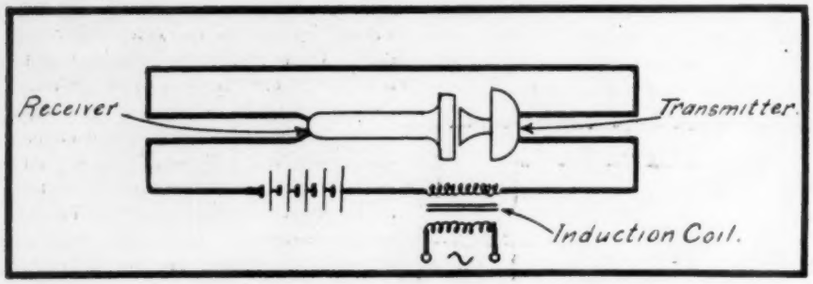


Fig. 16. High-Frequency Generator.

Under favorable conditions the capacity of a telephone line may be measured by this method, using a standard known condenser for the arm C_s. Generally, however, the inductance and resistance of the line make it difficult or impossible to obtain accurate measurements, and it has been found most satisfactory to use for C_s a telephone line of known capacity, and if possible of the same type of construction and of a length near that of the section of line under test. Good results have been obtained by using with the capacity bridge alternating current of a frequency of sixty cycles. Higher frequency current may be obtained by means of a howler, formed of an ordinary transmitter and receiver clamped together and connected as shown in Fig. 16.

A method which has also been much used in providing a detector and variable current for the capacity bridge to be used in making "open location" tests is the one shown in Fig. 17. The direct current galvanometer and battery are simultaneously reversed at a rapid rate by the relays.

The effectiveness of the Wheatstone bridge method of locating "opens" depends upon complete records of the capacity of telephone lines in good condition which may be used for comparison. This method is not reliable for long lines.

Measurements of self and mutual inductance may be made by the ammeter-voltmeter method, or modification of it, or by various modifications of the Wheatstone bridge method. As the necessity for such measurements on telephone circuits arises only infrequently only three methods of measuring self-inductance will be described.

Fig. 18 shows a Wheatstone bridge of inductances and resistances. The bridge must first be balanced with respect to resistance. That is, the resistances are adjusted until

$$\frac{R_a}{R_b} = \frac{R_x}{R_s}.$$

Alternating current of sine wave form is then applied to the bridge, a detector of alternating current is substituted for the direct current galvanometer and the variable standard known inductance is adjusted until a balance is obtained.

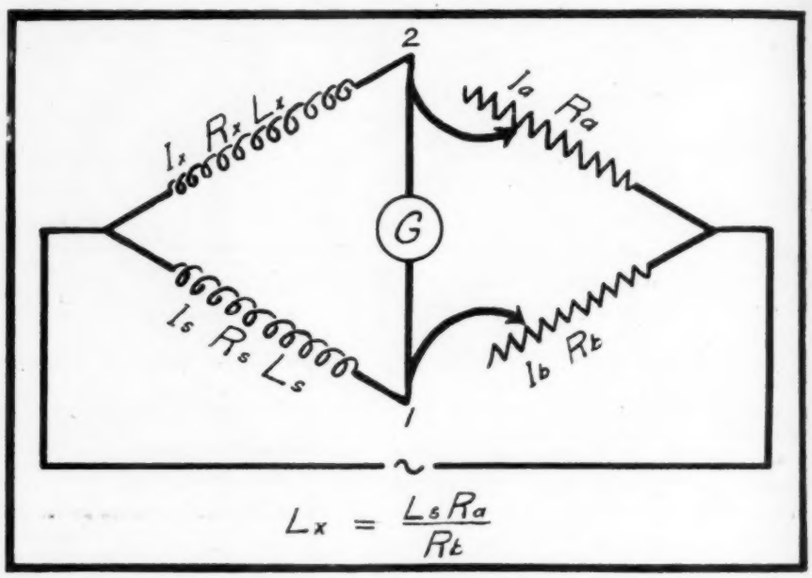


Fig. 18. Wheatstone Bridge Method of Measuring Self-Inductance.

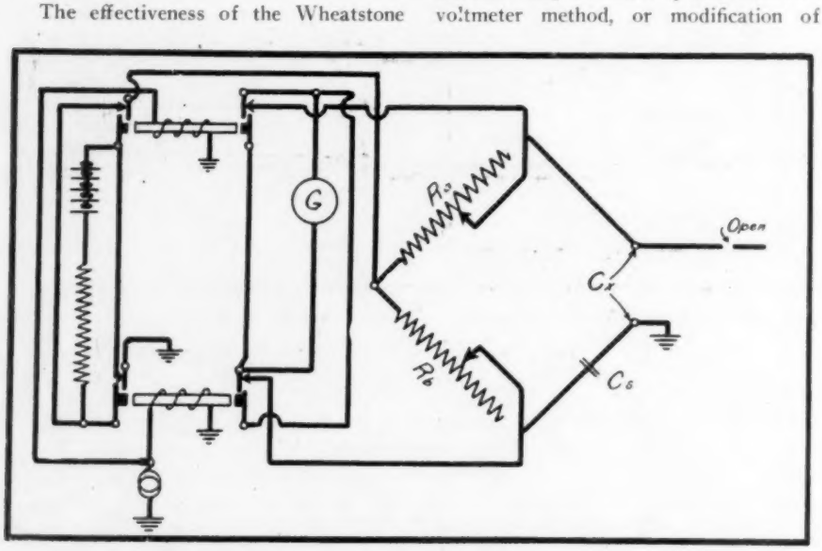


Fig. 17. Location Test with Reversed Battery and Generator.

Then because points 1 and 2 are at the same potential,

$I_a = I_x$ and $I_b = I_s$, and

$$2\pi f L_s I_s + R_s I_s = 2\pi f L_x I_x + R_x I_x,$$

and $R_a I_a = R_b I_b$, and $R_x I_x = R_s I_s$.

Subtracting equals from equals, the remainders are equal, and

$$2\pi f L_s I_s = 2\pi f L_x I_x$$

Dividing equals by equals, the quotients are equal, and

$$\frac{2\pi f L_s I_s}{R_s I_s} = \frac{2\pi f L_x I_x}{R_x I_x}, \text{ or } \frac{L_s}{R_s} = \frac{L_x}{R_x},$$

$$\text{or } \frac{R_x}{R_s} = \frac{L_x}{L_s} = \frac{R_a}{R_b}, \text{ or } L_x = \frac{L_s R_a}{R_b}.$$

It may be proven also that this relation holds for the general case where any varying voltage is applied to the bridge.

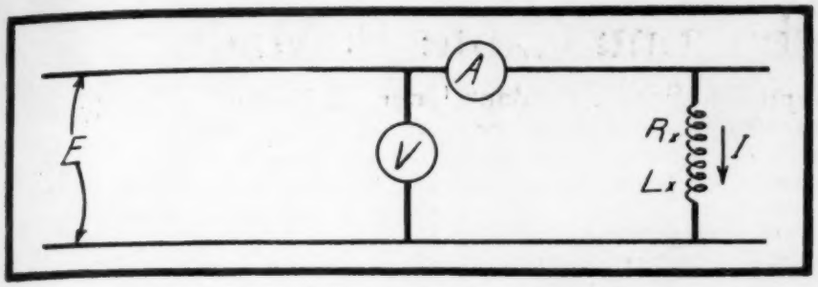


Fig. 19. Ammeter-Voltmeter Method of Measuring Self-Inductance.

Self inductance may be measured by the ammeter voltmeter method. As every coil or circuit which may be measured will have not only self inductance, but resistance, it is necessary to measure the resistance first. Then when the coil and meters under test are connected as in Fig. 19 and voltage E applied to the circuit,

$$I = \frac{E}{\sqrt{R_x^2 + (2\pi f L_x)^2}}, \text{ or}$$

$$L_x = \frac{\sqrt{E^2 - I^2 R_x^2}}{(2\pi f I)^2} \text{ henrys.}$$

The three-voltmeter method may sometimes be used effectively in measuring self inductance. A non inductive resistance is connected in series with the coil under test and the apparatus and meters are connected as shown in Fig. 20. Readings are taken of current, and voltage across the circuit, and across the resistance and coil. A voltage triangle is constructed as shown in Fig. 21. The side of the triangle representing the voltage across the resistance is then extended until a perpendicular to it may be drawn from the opposite vertex of the triangle. The length of this perpendicular then reprecents the self inductive voltage $2\pi fLI$, drawn to the same scale as the voltages which were read directly. As the current and frequency are known the self inductance of the coil L may be determined.

A method of locating crosses or grounds by means of a "jigger" or "wireless" test set or inductive fault finder is shown in Fig. 22. A buzzer of other apparatus delivering a high frequency alternating current is applied to the pair of wires which are crossed, or in case of a ground, to the grounded wire and the cable sheath. An exploring coil and receiver are used to locate the fault. When the exploring coil is between the end of the cable at which the alternating current, or "tone" is applied and the fault, the tone is heard in the receiver, but not when the coil is on the other side of the fault. As faults generally develop in man holes, the use of this apparatus at successive man holes beginning at the office at which tone is applied is frequently a convenient method of locating the fault.

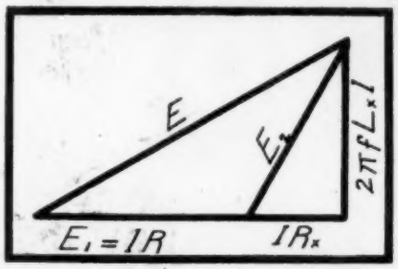


Fig. 21. Three Voltmeter Methods of Measuring Self-Inductance.

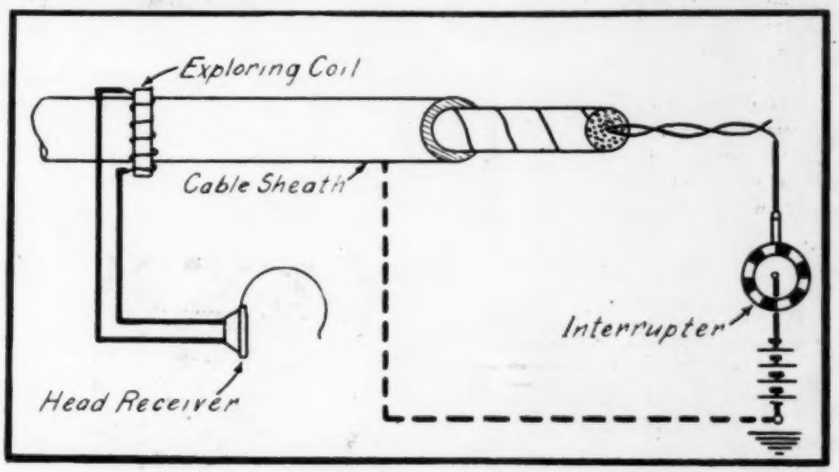


Fig. 22. Fault Location with "Jigger."

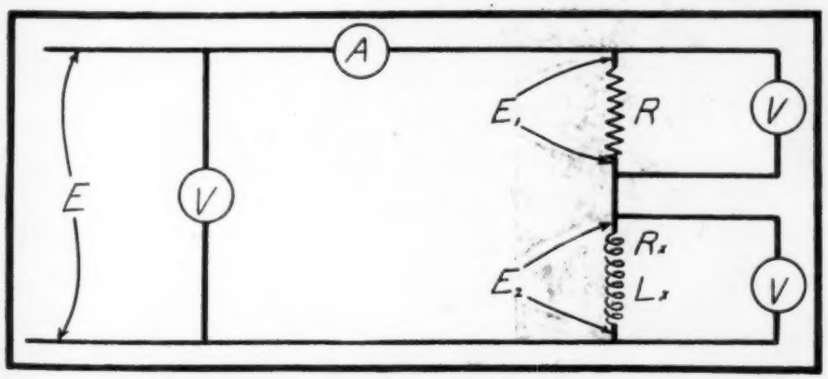


Fig. 20. Three-Voltmeter Method of Measuring Self-Inductance.

* * *

The office telephone in a well-known surgeon's office rang. The doctor himself answered the telephone. A childish voice inquired, "Who is this?" The doctor readily recognized the voice of his seven-year-old boy. Although an exceedingly busy man, he is ever ready for a bit of fun, if the opportunity permits, and anticipating such at this time, replied, "This is the smartest man in the city." The child mumbled for a moment and replied, "I beg your pardon, sir, it's the wrong number," and hung up.

* * *

During the encampment at Camp Dodge, Iowa, of the 366th Infantry, which was an organization of colored men, an operator had a call from a negro soldier for a party in Des Moines. The party had been called to the telephone several times and each time when ready to complete the connection the operator had a signal that the calling party had hung up. At last the soldier was asked why he hung up the receiver each time when he still wanted to talk. With amazement in his voice he replied: "Wha, Central, ah don' hang up de receivah; ah'm jes' restin' mah ahm on de hook."

How Telephone Cable Is Made

This Silent Avenue of Speech, Hidden Under the Ground or Suspended from Poles Is a Mystery to Most People

HOW many times have you seen telephone men string cable or "feed" it into manholes in the downtown streets, and wondered how it was possible to get so many wires into such a small space?" asks the Western Electric News in introducing an interesting article on the making of cable.

The materials of which cable is composed are copper wire, paper, tin and lead. These come to the manufacturer by the carload, the wire rolled in coils, the paper wound on spools and the tin and lead in bars known as "pigs." The wire is known as "soft drawn." It has been thoroughly annealed, i. e., softened and made flexible and drawn to the proper diameter, and differs from the so-called "hard drawn" wire used in outside line construction in its toughness and flexibility. The paper, which varies in thickness from 2½ one-thousandths to 14 one-thousandths of an inch, is especially made and consequently very tough and durable. The metals, which are chemically pure tin and lead, come direct from the refiner.

The first process in the making of cable is the insulating of the copper wires with paper wrapping. The machine shown in Fig. 1 is for that purpose. It consists of a number of revolving discs, an equal number of "capstans," or large pulleys, and the "take-up" reels. The bare wire is coiled loosely around large iron spindles shown in the foreground in the illustration. From the spindles the wire passes over the pulleys at the top of the machine and through the center of the revolving discs. On the face of each disc a pad of the insulating paper is placed and as the wire is pulled through the hole in the center of the revolving disc by the capstan beneath, the paper is wound around the wire in the form of a spiral. The insulated wire than passes over the capstan and is wound upon the take-up reel below.

Each disc applies the paper to the wire at the rate of 2,400 "wraps," or turns, a minute. Various colored papers are used in order to identify different sizes of wire or different pairs of wires in the finished cable.

The insulated lengths of wires are often then twisted into pairs. This is done on the machine shown in Fig. 2. Two of the take-up reels, containing insulated wire of the same color, are placed on spindles in the machine. A capstan at the top of the machine then draws the wires through a "yoke" (a revolving plate pierced by two holes through which the wire is passed) twisting them together, and leads the twisted pair to another take-up reel. The machine is so adjusted that the length of the twist—that is, the number of twists to a foot—may be altered at will. Different lengths of twists are used for different "gauges" or sizes of wire and the length of the twist also varies for the more important service as between different pairs in the same gauge. All toll cables, however, are now quadded; that is, four wires are twisted together.

After the wires are paired they are next formed into a cable by the stranding machine. This machine consists of a number of revolving drums, which look like enormous skeleton spools. On the outer circumference of these drums are arranged different reels containing the pairs of wire. This operation is a very important one. A large capstan draws the center pair or pairs of wires

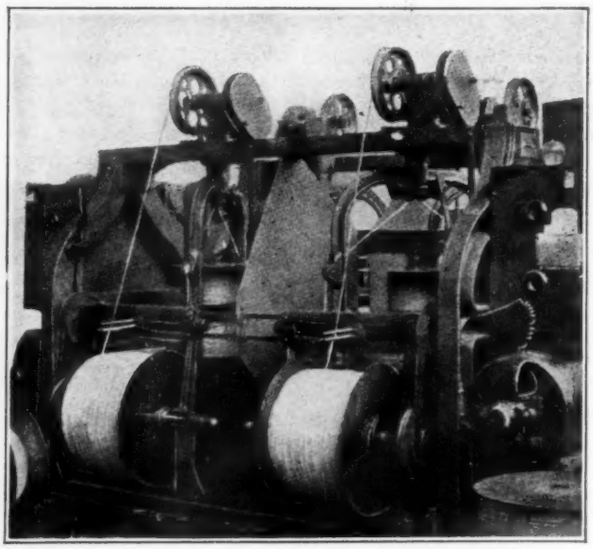


Fig. 2. Where the Wires Are Paired.

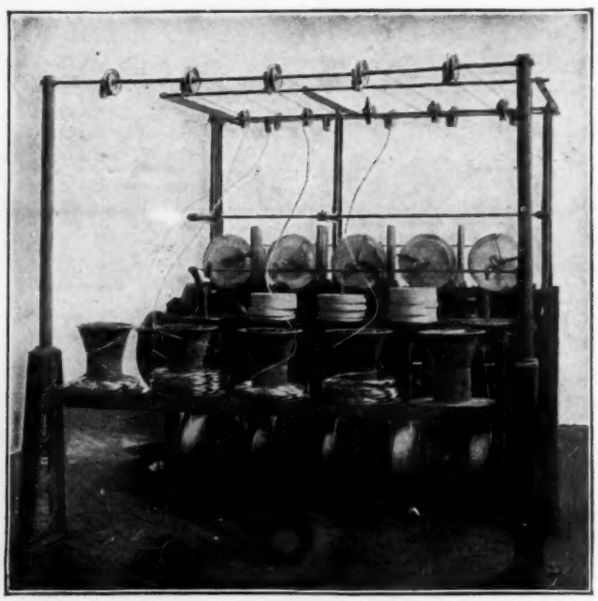


Fig. 1. The Insulating Machine.

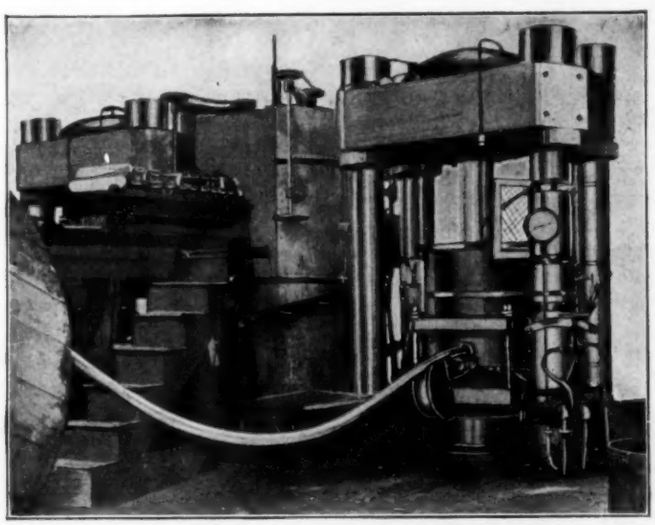
straight through the center of the machine. At the same time the drums revolve and the other pairs are unwound from the reel and are twisted in alternate directions around the center. The finished "core," as the unsheathed cable is called, emerges from the machine and is wound upon the capstan. The last layer of pairs is covered with a double wrapping of paper to protect the core from the lead sheathing.

In order to cut the cable to the length desired by the customer one of the center pairs is carefully measured and the location of the end of this pair marked on the outside of the core. As it is often important to the customer that the length be absolutely correct, a check measurement is usually obtained, either by means of a recording device on the front of the stranding machine or by weighing the completed cable.

The first three operations in the making of cable have now been explained: The insulating, the pairing of the wires and forming them into cables of varying lengths.

After leaving the stranding machine the length of cable core is carefully tested to see that none of the wire is broken, and also if the paper insulation is perfect.

The core is then placed in gas ovens heated to 200 to 250 degrees Fahrenheit. It is kept there from 15 to 48 hours, depending on the size and length, the amount of insulation or the purpose for which the finished cable is intended.



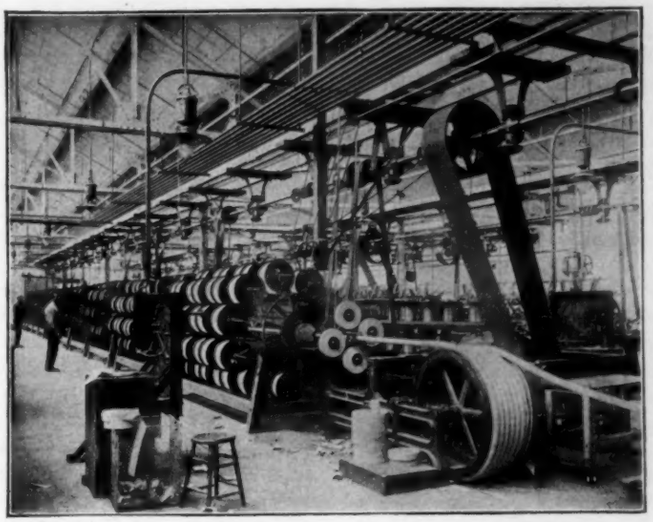
Feg. 3. The Machine Which Applies the Lead Covering.

When the core has been thoroughly dried it is put through the last manufacturing process, that of applying the lead sheath. The lead press, or sheathing machine, is practically a machine for making lead pipe. It consists of a huge pot holding the metal, a core and a die box, and a hydraulic press as shown in Fig. 3.

The pot, or container, is filled with molten lead to which a certain alloy of antimony or tin has been added. The bottom of the container opens into the top of the core and die box. The "core" is a pipe through which the cable passes; the "die" is a mold surrounding the core. The cable to be covered passes through the back of the machine through the core and the die. By this time the lead in the container is no longer liquid, but has cooled sufficiently to be in a plastic state. It would not do to apply the molten lead to the cable core because the hot metal would burn the paper off the wires.

The hydraulic press, working at an enormous pressure, forces the plastic lead through the die and around the cable core and thus surrounds the paper covered wire with a continuous lead sheath.

After the cable has cooled enough to handle it is given a final and very thorough electrical test. It is very essential that every cable contain at least as many perfect pairs of wires as are called for in the order. A few extra pairs are usually included in the order to make up for any defective pairs that may be detected in the course of the final inspection.



View in Factory.

If the cable tests satisfactorily, the ends of the core are impregnated with paraffin and the sheath is sealed up to prevent possible entrance of moisture. The finished product is then ready for shipment.

The processes just described are those for making telephone cable in general. There are, however, different types of cable and they vary somewhat in their manufacturing processes. The so-called "silk and cotton cable," which is used largely on the subscriber's premises, particularly for interphone installations, differs from the standard in that the wrapping of the bare wire consists of silk and cotton in place of paper. Submarine cable carries both heavier insulation and heavier sheath.

With this W. E. article were illustrations showing the principal stages in the development of paper-insulated cable used in the Bell Telephone System. Particulearly interesting was the difference between the cable of 1888 of 100 wires with that of 1914 of 2,424 wires.

The history of cable making is certainly interesting. The pioneers in this art encountered many difficulties at first, but would not give up and today the telephone system of practically every city is a silent tribute to them.

From a Manager to His Son

A Letter Filled with Practical Advice to the Young Man Entering Telephone Work, from *Southern Telephone News*

MY DEAR BOY:

As you, my son, have elected to follow in your Dad's footsteps and have entered the telephone career, I hope that with the grace of God and the general manager, you will some time or other, sooner or later, fill the chair I have been filling for a goodly number of years. I deem it not inappropriate to set down in writing some of the wide experience I have gathered in the long years as a telephone manager so that you may profit by it in your, I hope, long activity as a telephone manager, with a culmination of your telephone career in some higher job.

The telephone business, to begin with, is totally different in a great many respects from others. You may be a splendid executive in some private business and a darn poor telephone manager. On the other hand, the situation may be the reverse. In case of a private business, your customers are, no matter how numerous, confined to a certain class of people, depending upon the business you are in. So you can be constantly on guard when dealing with them, whether they are already customers of yours or not. As a telephone manager, however, every man or woman you meet in the street is either your customer or a possible future customer. You cannot know all your subscribers, either by name or by face; that is, in an exchange of any size. You cannot know them all by their voice when they call you over the phone.

So the one great requisite you will have to have is patience and never-flagging courtesy to each and every one, influential or otherwise, subscriber or non-subscriber. Not only should you be an expert along these lines, but every mother's son or mother's daughter employed in your office or connected with your household should at least equal you along these lines. It is a feature of our own business that the company as a whole will be judged by the personal impression made by you and the exchange employes, for "you are the company" as far as your town is concerned. I know it is hard at times, when dealing with certain subscribers who have liver trouble or are otherwise affected with the bug of constant criticism and opposition to public utilities, a standing hatred so to speak, to preserve your temper and constantly meet discourtesy with courtesy—you would not be a man were it otherwise—but, son, it has to be "did."

That is one of the differences referred to above between our business and Jim's around the corner. He can afford to be short with a customer, to express it mildly, once in a while. He knows the class of goods he has sold, he knows the price is all right, he knows his terms are all right and better than those of his competitor, he also knows he is not making anything off the particular fellow—in short, it's his business and no one else's. But the telephone exchange is not your business—not in that sense. It may be the company's business, but in the last analysis it's the business of the public, and the dyspeptic or otherwise cranky subscriber or even non-subscriber you have business with, is a part owner of the business. The maxim of our company has always been "to serve," and the word implies the relationship between you and the public in general.

To serve well means to please. Now you have two masters to serve—one is the company and one is the public. When I first, as a young man, was appointed a manager, between you and me, I did not know a thing about the telephone business except to be able to make out a financial statement at the end of the month from the monthly records of business done by the managers. I took a few days' instructions at another exchange managed by a man who was then a Nestor in the business, having grown up in it from its swaddling clothes. Of course, there was not much time to turn out a finished product. Even he could not do it in the limited space of my visit. However, he gave me one fundamental bit of good advice upon parting which I have endeavored to follow religiously—and that was, "Please the public and you will please the company." That is a broad statement, but the success in carrying it out depends upon the good, common horse sense of the recipient.

You cannot go helter skelter in these matters. A great many requests will be made of you, the carrying out of which would be distinctly against the "rules and regulations," or otherwise be contrary to the best interests of the company. Where such is the case, it is your duty to convince the party that, while you would like the best in the world to do as he asks, you just simply cannot do it, and then give him the reasons for it in a language which he can understand. Don't talk about bridges, relays, conductors, etc., nor talk to him about "rules and regulations." It is well to tell him the rule covering this particular matter and then explain the rule, and if you don't know the reason for the rule, why tell him you'll think it over, proceed to find out from someone who knows, and then call him or go to see him and explain why you cannot comply with the request.

Again, the company has in the past issued regulations, and no doubt will continue to do so, which have been criticized by the public. Remember, there never was a rule issued unless there was a reason for it, and generally a darned good reason. It is not only your and the commercial employes' duty to carry out these rules, but it is also your duty to find out the why and wherefore. Then, with you have some fellow come heaping hot coals on your head, you've got him right where you want him. You can explain, and when you do the explaining, do it in such a way as to leave a good taste in his mouth and let him depart from your office with these thoughts in his mind: "That is a nice fellow. The company he represents is O. K. There is nothing of the 'public be damned' attitude in them." Again, peculiar circumstances may arise where it would appear advisable to you to break a rule. Well, think it over carefully and then act. Be sure, though, of your ground, so that when you are called upon to "explain" you have reasons that are just as convincing to your superior as the reason for the issuance of the rule in question should be to the public under ordinary circumstances. It is in such cases that the company expects to benefit through the good judgment and initiative of its representatives.

While it is a mighty good thing to say "Treat everyone alike," it is quite natural and no more than human to have some folks in your exchange you will be more anxious to please than others. You come into close contact with lots of people who are or may be in a position to be of service to you personally or in your capacity as a manager; in other words, to be of service to the company. As to personal reasons, there should not be any. If you live as a self-respecting man should live, and as no doubt you will, pay as you go and there won't be any come-

back. True, circumstances may arise over which you have no control and some friend be of great help to you. He wants the favor returned. Not that he puts it that way, but your sense of obligation makes it appear so.

If the request is such that it can possibly be done and the service rendered you was of a personal nature, make a personal sacrifice and comply with it. Let it be a personal transaction between you and John and not between the manager and Mr. Smith.

If the matter cannot be handled in a personal way, and it will involve you in your capacity as manager, explain to him your willingness and your inability to comply. If he is the right sort of fellow, he will understand your position. But if the request is made on the part of a person who has been or may be of service to the company and you cannot conscientiously comply with it because it's "against the rules," use your utmost tact and endeavor first in getting him to withdraw the request; and if unsuccessful, then "pass the buck" to your boss; give him all the details in the case, make your recommendation and put the responsibility of either denial or granting of the request on him.

Don't form the habit of "passing the buck." It's a bad habit and grows on you with practice. Be a man and take the responsibility on your shoulders that your title implies. Be a manager not only in name. While your superiors will always be glad to render all possible help and to give advice, they have, as a rule, short patience with a man who is afraid to act when the decision is clearly within his duties. And if it has to be done, if the matter under consideration is without your jurisdiction, analyze the situation, go into every detail, consider it from every angle, so that you may be prepared to answer any question put to you. Remember that your boss in nine cases out of ten does not know an iota of the situation. Place yourself in the position of the boss and think what questions would occur to you if a similar case were put up to you to decide and you were totally ignorant of the circumstances surrounding it.

This also holds good in correspondence. Be brief and to the point, but be not too brief, relying upon the good memory of the boss to remember details of which you may have advised him six months ago or possibly not at all. If it is necessary to refer to previous correspondence, do so, giving all information which will enable him to locate the file without much trouble and loss of time. Don't ever put the burden of the work on the man to whom you look for help or advice—that's your job.

Let me again stress the point that no one should ever leave your office with the thought in his mind that an injustice has been done him. If you do, that man may through a change of circumstances in later years be in a position to harm the company greatly.

He may have forgotten you, he may even have forgotten the incident itself, but he still has the rankling feeling that once upon a time some dealing he had with the company left a bad taste in his mouth and he has been waiting all these years to get even. You may have been perfectly within your rights at the time, but you did not attach enough importance to the man or to the matter in dispute to settle the latter as I have tried to outline in the beginning of this letter, which was that no one should ever leave your office unconvinced of the justified stand you or the company has taken in your controversy with him. If so, you may do yourself and the company an injustice at the time, and may be doing a great injustice to your successor under whom the matter may crop up, and he will be placed through your act of negligence at a great disadvantage. You never can tell which leg a mule will use to do his kicking; and therefore I say, "Whoa, there!" Always place yourself in the other fellow's position and treat him just like you would want to be treated yourself. You cannot go wrong very far when you handle every man or woman in that manner, and as woman suffrage is now an established fact, why remember what Shakespeare said about the woman scorned.

As a matter of fact, woman is far from being a negligible factor in our business. As long as we have operators to handle the traffic and as long as perhaps the majority of our calls are originated by the ladies, God bless them, we will have more service complaints from or through them than from men. Woman dealing with woman—therein lies the psychological feature in the case primarily. Secondarily, however, women generally have less conception of the intricacies of the telephone system than men. The using of the telephone is so simple, such an every-day occurrence, that its magnitude among the inventions of the last and this century has been gradually lost upon the average person. We have stopped wondering at the fact that we can talk two miles, twenty miles or two thousand miles away from our house. I have always believed that it is good policy to pay special attention to the women, to revive or to incite their interest, to show them what we have to do to enable them to talk over the telephone, and above all to bring about the personal touch between them and our operators. If you succeed in doing that, you will succeed in stopping many little irritating features of our business, and every such woman thoroughly convinced will be the means of convincing others.

The public should be informed of our doings, so far as they are of interest to the public. If we extend our plant, we do so with a purpose in view. That purpose is always an honorable one, and then why not tell the public? Your local newspaper is therefore a valuable and necessary adjunct in your business and the newspaper man should at all times be yours and the company's friend. Cultivate him and his friendship, but be careful that you don't show any favoritism among newspaper men if two or more newspapers serve your town. If you have any news to give out, give it to all those who care to accept it. Make the ties of friendship so strong that you will get advance notice of any unfavorable criticism. This will not only put you on your guard, but often will give you occasion to make satisfactory explanation to the editor and so prevent the publication of the item.

Remember the psychological feature of our American newspaper life. When the average man or woman reads it in the paper, it must be so because it's in the paper. Just let a letter from a "citizen" appear in the paper criticising the service, and the next day you will be swamped with service complaints, real or imaginary. That article in the paper has brought to the minds of lots of people that they had a "kick" coming, too. Maybe they had, but it was not of sufficient importance to call the manager until the article appeared in the paper. So you can see the importance of preventing, if possible, the discussion of the service or any other matters of this nature, in the newspapers.

And now, son, I will have to close. Public relationship is of such importance to us, is of so vast a field, that I could talk to you for hours on it. Remember, it is the cornerstone upon which the structure of our business is built. May the service be ever so good, may the plant be in ever so excellent a shape, if the proper public relationship is lacking, the company and you suffer. There is no one else in the organization in your exchange on whom the responsibility for its existence or the lack of it falls. It is only natural that those of the employes under you will imitate the attitude you take in this question. If you show the proper spirit, they will unconsciously do so also.

Your Old Dad.

Ohio Works on Timely Problems

Twenty Sixth Convention of Ohio State Association Discusses Finances, Public Relations and Construction

OHIO'S twenty-sixth independent telephone anniversary meeting was marked by emphasis of the telephone industry's substantial position during the readjustment period.

Even the Columbus chief of police, who welcomed the delegates on behalf of the city, confessed the protection of the city's welfare was largely dependent upon proper telephone service. Chief French remarked that 86 percent of police business with the public is conducted by telephone, and 95 percent of calls for the police came via wire. He further commented on the improvement effected in police telephone service by the substitution of telephone company trained girls for policemen.

BIG MEN IN OHIO ASSN.

Ohio has been favored by having two of its telephone chiefs high in the nation's councils, President Harding and Attorney General Hugh M. Dougherty having been active in previous Ohio telephone conventions. The convention officially congratulated its two star political performers. That Harding and Dougherty were representative of the caliber of Ohio telephone men, is indicated by the timely and practical character of the convention program and the constructive spirit of the meeting.

President Frank L. Beam's address called attention to the penalties of delay in commission action on telephone rate increase pleas. He also commented on the comparatively favorable position of telephone securities due to telephone companies not being compelled to charge off inflated inventories. Recommendation of more aggressive and complete propaganda correctly placing telephone companies before their publics also was made by President Beam. The work of the Ohio Committee on Public Utility Information was lauded in this connection. Construction co-operation between the various public utility companies was urged, as was the paying of salaries that would attract the highest class of labor and assure maintenance of properties and service at the right point.

Wide distribution of telephone securities was mentioned as affording an opportunity for intensive advertising and co-operation in boosting good will that was far too valuable to be overlooked. Simplification of accounting practice also was slated as one of the important subjects for association activity. The hard dig of taxation improperly imposed also came in for attention. Mr. Beam told of one instance where rate increases were absorbed by increased taxes, leaving the company out of luck in the matter of urgently needed operating funds.

Remarks of Washington Hyde, giving the number of independent telephones in Ohio between 800,000 and 900,000, and the report of Treasurer Frank E. Wesley, showed the thriving condition of independent telephone business in the state.

Secretary H. P. Folsom's paper on collective bargaining told of the menace of this practice in telephone company operation.

A general survey of business conditions, with their effect upon the present and future of telephony was given by R. H. Schryver, president of the Citizens Trust and Savings Bank, Columbus.

J. D. Ryan's paper of "The Question of Taxation," telling of the necessity of public education in tax matters, and "Creating Good Will for the Utilities," a paper prepared by B. E. Ling, and read by G. C. Maxwell, were well received.

Mr. Ling, director of the Ohio Committee on Public Utility Information, gave some valuable pointers on reaching the newspaper editors with public utility information that they are willing to print. Mr. Ling's publicity platform for utilities reads:

"First. That the telephone, gas, electric light and power and city and interurban traction companies are rendering an essential service to the communities and that without these services being adequate, complete and healthy, the business and social life and even the health of the community in which they operate, must and will surely suffer to the degree in which these utilities are not up to the standard to which they ought to be.

"Second. That these utility companies cannot furnish an adequate service and measure up to the efficiency that they should unless their income meets the cost of production plus a fair return to the investor, who, by risking his money in these enterprises, makes the service they render possible.

"Third. That the utilities are under strict state regulation and that, therefore, they are unable to have any 'water' injected into their capitalization and that the rates they may charge are fixed by the public's representatives only on the basis of the value of the property used in rendering the service.

"Fourth. That the utility companies differ from other private corporations in that they are on trial before the court of public opinion 24 hours of the day and every day of the year, because their service must be ready every second of every minute of every hour of every month in the year.

"Fifth. That the public utilities differ from other business in that they can make no exorbitant profits because the state limits the amount of the return they can pay investors and also prescribes the service they must give to the public.

"Sixth. That unlike other private business enterprises where the invested capital is, in the course of the year, turned over twice, three, yes even four or five times, public utilities must use between $3 and $5 of the investor's money for equipment and plants to get a return of $1 of the consumers' money.

"Seventh. That the public utilities' stock is not held by any small coterie of wealthy individuals, but that hundreds of thousands of average citizens are investors in these public service companies, and that every citizen who is a beneficiary under or a holder of a life insurance policy, or who has money deposited in a savings bank, is financially interetsed in the prosperity and stability of the utilities because millions upon millions of dollars of the funds of our insurance companies and the savings banks are invested in public utilities' securities."

F. B. MacKinnon, president of the United States Independent Telephone Association, in his address "Telephone Problems of 1921," spoke of the advisability of a change in the method of fixing rates. He counseled rates that would give incentives for betterment in service.

F. A. Tinker on "The Utilities and Their Relation to the Public," and P. J. Duffy, telling of the "Workingmen's Compensation Law," added to the interest of the sessions.

Other papers which were convention features were those by Gustav Hirsch on the value of a budget to a telephone company; B. H. Brooks' practical contribution, "High Tension and Telephone Lines," and that of J. W. Stafford on "Community Service."

All officers were slated for re-election. This makes the administration: Frank L. Beam, Mount Vernon, president; H. P. Folsom, Circleville, sec.; Frank E. Wesley, Columbus, treas.

If All Utilities Stopped Operating

This Question Was Asked the Students of the University of Illinois. This Essay Won the $25 Prize

By MARY C. FUNK

"WITH a wave of her magic wand, the fairly godmother changed the pumpkin into a golden carriage and Cinderella, in her beautiful new clothes, rode off to the ball at the King's palace."

The story of Cinderella is not new to us—most of us grew up hearing it over and over, just as we have grown up with electric lights and running water, street cars, telephones and fast trains. And, like Cinderella, we do not realize until the clock strikes the midnight hour, or something happens to our conveniences, just how much we have prospered since our fairy godmother, the public utilities, came into our lives and bestowed favors. The drudgery of the kitchen work is over, the darkness of the nights with only a dying fire or a candle for light, have passed for us as well as for the scullery maid in the fairy tale.

Public utilities, as we understand the term under the present law of this state, supply gas, water, electricity, heat and transportation, and also provide means of communication by telephone and telegraph, carry our household commodities as freight, express or baggage, store our valuables in warehouses and our grains and food in elevators. It is very evident that present-day life requires and cannot exist without the service and products of public utility corporations.

Just how much communities depend on these utilities for prosperity is shown in the case of towns which have been deprived of their services. Householders in Galena, for example, look with dismay at their gas stoves, heaters and other gas-using arrangements. And they look with more dismay at their bills for coal stoves, oil lamps and such fixtures. All this came about because the gas company, which has served Galena, the oldest city in the state, for 70 years, failed when the rates were lowered. Business men of that city say that it is the most serious calamity that has ever befallen Galena, and everyone will feel the effect in the way of depreciated property values. And think of the inconvenience of it!

An amusing incident in an Indiana town illustrates the important, yet homely, part these utilities play in our lives. The traditional Saturday night bath of residents of this little town was threatened with the additional hardship of darkness, when the gas service was discontinued in the early afternoon of the patron day of the tub. But lo! and behold! the service was for some reason resumed and the citizens continue to take part in the ancient custom.

Illinois is an agricultural state much like South Dakota, where a survey of four counties was recently made, which revealed the pressing need of man-made power, instead of man-power. On sixty-one percent of the farms, water had to be carried an average distance of 72 feet, and on one farm, the water supply was half a mile away. Women work 15 hours a day in summer and 12 in winter. No modern conveniences, such as running water, gas stoves, or electric washing machines lighten the drudgery of their lives. Only nine farms had bath tubs, but 80 percent had "tin Lizzies." Nearly everyone used oil lamps for light and wood stoves for heat.

What would a survey of Illinois farms show? Probably, in most cases, the same dreary picture. No wonder the "down on the farm" life is unpopular.

Public utilities are truly public. About 275,000 residents of Illinois own public utility securities. These persons with their families, represent one-sixth of Illinois' population. Next to government bonds, these securities are more widely owned than any other class of investment. People in every walk of life own them—the "butcher, the baker and candlestick maker" as well as "doctor, lawyer, merchant, chief." Among the bondholders of many utilities are women, trust estates, hospitals, colleges and churches. The man who carries a life insurance policy in an old-line company has an interest in public utility securities, because practically all old-line companies own them. People are interested when and where their savings are invested, in this case in utilities, and are anxious for them to be successful and prosperous.

Prosperity is strictly an economic term. A community or a state, like an individual, is prosperous when it is doing well, when there is plenty of business conducted with a profit for those engaged in it.

Even before the days of public utilities, there have been prosperous communities and individuals. A cave man, in prehistoric days, may have been a person of importance and many flint axes, or an Indian a "heap big chief" with many ponies and much corn. Chicago "boomed" when extensive lake traffic began; the coal fields brought wealth to the southern part of Illinois.

All prosperity depends on the exchange of goods or commodities, and involves production and distribution, or sales. A community which by accident, design or misfortune is poorly served by any of the so-called public service corporations, is a community which necessarily is behind in its material development. A community suffering from faulty equipment or management of the public service corporations likewise endures a consequent loss of material advancement with attendant inconvenience and dissatisfaction.

The instant pure water ceases to flow through a city, death comes. If the great electrical plants should close, because of a coal shortage, for example, not only would the lights go out, but the machines in factories would "go dead," elevators would stop, confusion would follow the dead telephone wires, disorder and panic would result from the stopping of street cars and means of transportation. All that is necessary for the support of the people and the maintenance of order would be at a standstill.

For the modern city has become dependent on its water, gas, electricity, street railway, telephone and other utilities. No matter what the hour or day, they must meet the demand of the public.

The huge scale on which utilities are run is shown by a few figures on the annual production of artificial gas for fuel and light, which amounts to about 800 billion cubic feet of gas, traveling through 70,000 miles of mains, or nearly enough to encircle the equator three times, and which serves a population of nearly 55,000,000.

Public utility service is no longer a luxury to be enjoyed by the few. It has long since been an urgent necessity of practically all urban residents and is rapidly being extended to meet the demands and needs of the rural community. For a few cents the individual can use properties worth millions of dollars. For the simplest short telephone chat between neighbors, hundreds of dollars worth of property is used.

Arranging the Armistice

by Frank Kavanaugh

JOHNNY RINGO came to us just before the slump in business struck the town, the people and, of course, the company. Two weeks after he caught on all the big factories began laying off men until only the board of directors was left. Of course it couldn't last. The factories slyly began replacing the men, weeding out only those who had proved incompetent, but the thing gave the big business men of the town the excuse they wanted, and as Johnny had come to us to increase the B.P.X. business, you may imagine what we thought about his ultimate success. For Johnny was shy, red cheeked and as polite and pleasant as a little boy raised with Fauntleroy curls. If he was at all inclined to be pessimistic, no one knew it, for he smiled and blushed at us all. The girls at central loved him, and called him "the little dear." That was because of his pink cheeks and his ability and willingness to help out at any job one cared to foist upon him.

When the slump hit and then the slight reaction began, with the incompetents left out, we thought Johnny was due to be the next one disconnected from the payroll. So far, as one could observe from appearances, he had done nothing whatever, and we thought he had merely fooled the "old man" with glowing prospects. But somehow the thing didn't work out that way. Just the day before the payday on which we had it doped out that Johnny would be fired he brought in the contracts for a P.B.X. in old Samuels shop. Samuels dealt in cheap clothing, made by a hundred girls up on the fourth floor of a big building down in the tenement district. As he made cheap clothing he had laid off none of his force, but as they worked piecework he had extended the hours which he allowed them to work by three every day, and because of that the foremen and forewomen had to work longer, which made them get up at a time when even the early-rising roosters out in the barnyard were turning over for another hour's nap. And because old Samuels wanted to be sure the foremen were on the job and Johnny found it out, he landed a P.B.X. contract—his first.

Now these foremen and forewomen were well paid people and wanted to hold their jobs, it paid them to answer the telephone in their respective departments within a few seconds after the ring came, so that the lady in the office on the lower floor would not report "they don't answer, Mr. Samuels—the ladies' cutting department don't."

A few days after Johnny brought in a bunch of contracts and the money for three months' service, as required by the rules. He laid them on the old man's desk and was walking out, when the boss happened to glance at the name signed to the upper contract. He adjusted his eyeglasses and looked again. "Mr. Ringo?" he called, "will you come back here, please?"

We thought the time had come when Johnny would be uncoupled from his semi-monthly check and every ear in the room was attuned to see how the old man would do it. We had heard him do the same thing fifty times, but he always changed his method every time. "Variety is the spice of firing," was the old man's method.

Johnny walked back to the boss, blushing as if he had been discovered kissing the stenographer—not the old man's, of course, for she was sixty if she was a day, but one of the young ones in the outer office who combined powder puffs with pothooks.

"What's this signature, Mr. Ringo?" the old man asked.

Johnny looked at it and we thought he sneezed.

The boss turned over the upper one and came to the second. "And this."

Johnny made a sound like a man choking.

"C-z-n-i-z-t-o-k," the old man spelled slowly. "Has he anything?"

"His check is there, sir," Johnny said, "and as I was doubtful about it myself I took it to the bank and got it certified. It was made out to the company and of course I couldn't cash it. The teller gave me the information that the bank had been cashing the man's checks for fifteen years. The other contracts, you will see, are covered by the cash payment for three months."

"And they talk English?"

"After a fashion; yes, sir."

"That will be all, Mr. Ringo."

Johnny blushed again and walked away, and for the nonce we forgot the incident. It was not recalled until one day Miss Clara, the day chief operator of the main exchange, happened to be in the cafeteria at luncheon when I found a parking place with my roast beef and gravy next to her.

"You know Mr. Ringo?" she asked. "One of the commercial force?"

"Johnny?" I asked in return. "Yes, I know him. We all know him. He blushes so prettily."

"What's the mystery about him?" Miss Clara asked.

"Maybe he uses blush powders," I said, thinking she was referring to the habit of his.

"Not that," she said, "He didn't get that in a drug store. The blush came to him when the doctor came in and told his father it was a boy. But the business he gets. He turned in about twelve or fourteen contracts."

"I know that. What about 'em?"

"There's never been a call in from one of them yet."

"You mean they never use their instruments."

"Never. I usually keep track of the new subscribers. Like the old ones, each has his or her individual idiosyncrasies, and by learning them and keeping them in mind, I sidetrack a lot of trouble for myself, the girls and the company."

"And Johnny's subscribers just pay the three months' rental and have no indio—let it go—that you can find out."

"They have an instrument connected and then disappear so it seems to me. I've called one or two and there was no reply."

"Assuming the attitude of Sherlock

Holmes, I'd say that Johnny is the son of a rich man who wants him to succeed in business and Johnny is just paying his own money to have telephones installed so as to make a showing," I suggested.

"I happen to know better," Miss Clara said, as she attacked her pie a la mode. "Just before last payday the young man's shoes were out at the heels and there were holes in them. The day after payday he had them mended and half-soled."

"From that you deduce that he is two weeks ahead of starvation, like most of the rest of us, eh?" I inquired.

"He's depending on the little paycheck to connect with his pie and coffee," Miss Clara said. "If that happened to develop a short or the pole changer in the shape of the cashier failed to signal his check he'd be like the rest of us, hunting another job."

"So the rich father gag doesn't work out," I remarked. "I'll tell you what I'll do," I added. "I'll find out who was foreman of the installing gang that caught Johnny's new ones. He'll explain—even if I have to blow ten cents for a goblet of the 2¾ foamy for him."

"I've looked into that. In every instance Johnny was Johnny-on-the-spot and in some instances unlocked the doors of the places where the instruments were placed."

Miss Clara used the paper napkin and rose. "This 'phantom phone' business is the first mystery I've seen in the business and I've been here since—well, sometime."

A week later Johny brought in a P.B.X. contract from the American Bakery, operated by a man named Papougoulous, and it was installed. Since the proprietor of the American came from near Athens and started a little establishment he had prospered into a four-story fireproof building. The P.B.X. contract was not hard to land, we knew—merely a case of "go and get it."

But four or five days thereafter Johnny came in and laid a bunch of individual contracts on the bosses table. I was near him when he did so and I looked at the signature on the top one. It was about thirty letters long. The following day I met Miss Clara entering the cafeteria as I was leaving.

"There'll be some more mystery installations," I said.

"How do you know?" she asked.

"A little pink elephant flew by my ear and told me," I informed her.

But only about half the new ones were of the phantom sort. The rest seemed half human.

On the night of our annual ball Johnny took little Miss Mims, one of the prettiest girls that ever held down a long distance position. He danced with her assiduously until five minutes of twelve o'clock, when he excused himself and left the hall. At five minutes of one o'clock he left her again, and when the thing broke up after "Home, Sweet Home" at ten minutes of two, he excused himself and left, and did not return until nearly everyone else had left and little Miss Mims was on the point of tears. But he did come back and took her home. It was not for a month or so after that she would speak to him. And this is how it came out.

The steel factory had resumed work at half force and the day after Johnny brought in about fifty contracts—everyone signed by the queerest signatures imaginable. The old man motioned Johnny to stay a few moments and turned the sheaf of signed papers over and over.

Brander's going to leave the first," the old man began, as Johnny stood and blushed, "and I'd like you to take his place. It'll give you charge of the entire commercial department and double your present salary. This company puts a man in charge of a department and expects him to make good. His methods are not questioned. But I'll ask you, just from curiosity, how you get these contracts you've been bringing in. I never knew so many foreigners existed before, especially those who could afford telephones. How do you do it?"

"I got old Samuels for a P.B.X.," Johnny said. "A lot of his employes are high-salaried foreigners. Since things have quieted down there aren't so many high-salaried jobs going begging, and those holding them want to keep 'em. They like to be prompt, especially when they know the boss can call their department from his home and talk to them personally. So I got every salaried worker in the shop by promising one thing. At 5 o'clock I call their number and keep the operator calling it until they answer. No chance for the alarm clock to run down or fail. I call, same way with the new bakery, same way with all of them. The new bakery's the hardest though. Some of them start work at one o'clock in the morning, some at two, some at three. But I'm afraid I've lost more than I've gained, for——."

"How's that?" the old man asked.

"On the night of the ball I angered Miss Mims when I went to call the heads of the mixing department of the new bakery. There's Georgoulougoulos and Cragougou——."

"She got angry, eh?" The old man almost smiled.

"You see, sir," Johnny explained, "I couldn't really tell her why I left her, and it is not regular for operators to make these calls and ——."

We'll make it regular," the old man said. "By the way, you might tell this Miss Mims that you're to be promoted soon and use your influence to get her to rescind her action and—to tell you the truth, while I am not personally acquainted with Miss Mims I've had a lot of experience with women folks and I think they admire a man who finds a way to get promoted. I think you can arrange an armistice and perhaps a coalition with the lady if you tell her you are to become a department head. Good evening."

And Johnny did.

Indiana Convention

An Enthusastic Meeting of the Northeastern Indiana Telephone Association Held at Fort Wayne, March 15th

The first meeting of the Northeastern Indiana Telephone Association was held at Fort Wayne, on March 15th.

President, Senator W. E. Bowers opened the meeting with a short address of welcome, concluding his remarks by announcing the first part of the day's proceedings—the election of officers for the ensuing year. By unanimous consent the chair was authorized to appoint a nominating committee to nominate a complete ticket, consisting of president, vice-president, and secretary-treasurer, and report in the afternoon session. The chair thereupon appointed E. L. Taylor of Fort Wayne, Indiana, Max F. Hosea of Indianapolis, Indiana, and E. L. Gaines of Fort Wayne, Indiana, as nominating committee.

There being no further business to transact, the chair introduced Mr. F. E. Bohn, secretary and general manager of The Home Telephone & Telegraph Company of Fort Wayne, Indiana, who took as his subject for discussion, "The Telephone Industry and Its Chances in the Re-adjustment of Industrial Conditions."

In a masterful manner Mr. Bohn portrayed to his hearers the evolution of the telephone, from its inception as a crude sound conveyor of forty-five years ago to the present wonderful and scientific instrument, carrying the human voice from one end of the continent to the other—from a mere toy, ridiculed at first by many, to a convenience enjoyed only by the well to do, a few years later, to its present envious position as a most important and essential factor in business, commercial and social life. Continuing, Mr. Bohn said in substance: "In forty-five years the telephone industry has grown from a mere nothing to a power surpassed by few other industries, both as to the importance of its product, as well as to the vast investments necessary for its operation. The telephone business is a wonderful business and is less effected by industrial depressions than any other industry. Its development in a comparatively short time has been phenomenal. Today, in its forty-fifth year, it has become a necessity to more than twelve million of the country's best citizens to such an extent that a sudden cessation of the telephone service would mean the utter collapse of all business activities, especially in the large centers of population where thousands of people are isolated in the upper stories of high skyscrapers and to which telephone service is as essential in the conduct of their business as electric light and power. The telephone business is such an important link in the chain of commercial endeavor and is so vitally connected with the business welfare of every community throughout the country, that it should inspire those connected with it to the highest ideals in their endeavor to place their business on a par with every other business in their community.

"And yet, it is safe to say that comparatively few telephone men realize, even at this day, the importance and dignity of the telephone business. So many telephone companies neglect to impress their fellow towns people with the importance of their business in the community so that they in turn look upon the telephone manager and exchange as something inferior to other concerns, whose outward appearance is evidence of their prosperity and progressiveness. There is no reason why the telephone exchange and office in any town should not compare favorably with the offices and fittings of the banks, for instance. Instead of being tucked away on the second floor of some old rickety building, accessible only, in a great many places, over a not too clean stairway, through some dark, dingy hallways into an untidy office, to which the public and the subscribers are forced to go if they wish to make a long distance call or pay their bills, they should be located on the ground floor in respectable, clean quarters, easily accessible to the public and the subscribers and furnished in such a way as to be a credit to the community. The manager of the telephone plant, in any town, should command the respect and esteem of his fellow townsmen in the same degree as the officials of a bank and his personality should be such as to inspire them with confidence and respect toward the telephone business. The telephone business is certainly as important and of as much consequence as the banking business. If the telephone manager will keep this in mind, if he will keep his house in order, so to speak, make his place of business inviting so that his subscribers are glad to visit him and do business with him, if he will furnish real telephone service, keep his outside construction and his apparatus in proper shape and of neat appearance, if he will see to it that the operators and other employes perform their work in an efficient and courteous manner, he is sure to succeed and gain a place in his community such as is enjoyed by the banker or any other business man of his community. The telephone business is the greatest business on earth and its future prospects are the brightest. Its intimate relations with public gives it a position of trust which requres considerable tact and personal ability on the part of the telephone manager and his employes to conduct it successfully."

Mr. Bohn's concluding remarks expressed an optimistic view of the future improvement and development of the telephone business. The very reason that it is under the control and supervision of the Public Service Commission and the Interstate Commerce Commission protects its stability and removes it beyond the frenzy of speculative manipulations and makes it a safe investment which will become more and more apparent as the public becomes convinced that the telephone industry has a right to decent living conditions and that the proper telephone service can only be furnished at adequate rates. It is, therefore, safe to say that the telephone business under proper management is well able to "weather the storm and come out whole" through the present period of financial depression and more than that, it is bound to prosper and grow after normal conditions are again established in the political and commercial life of the country.

Mr. Bohn's remarks were followed with deep interest by his hearers and will, undoubtedly, accomplish some of the reforms suggested by the speaker.

Following Mr. Bohn, Mr. Max F. Hosea, treasurer of the Indiana Telephone Association, gave one of his animated "Talks" which was closely followed by his audience In his talk Mr. Hosea took occasion to extol the merits and significance of the "Bulletin," the official organ of the Indiana Telephone Association, and its importance to the telephone business at large.

The chairman then called on the nominating committee for their report. E. L. Taylor, chairman of the committee, read the report, placing in nomination the following gentlemen: President, P. J. Maloney, manager of the Whitley County Telephone Company of Columbia City, Indiana; vice-president, C. L. Knipple, manager of the Indiana Bell Telephone Company, Huntington, Indiana, and secretary-treasurer, Martin Umbach, toll commercial superintendent of The Home Telephone & Telegraph Company, Fort Wayne, Indiana. The chair thereupon called for a vote, suggesting that a ballot be dispensed with and the vote

be by acclamation. A motion to this effect was made and the chair cast the unanimous vote for the gentlemen nominated. The chairman then asked the newly elected vice-president, C. L. Knipple, to preside at the meeting in the absence of Mr. Maloney, the new elected president, at the same time introducing Mr. Knipple as the next speaker.

Mr. Knipple took up the subject of "Plant Accounting." This subject, as Mr. Knipple remarked, is one of utmost importance in the classification of expenditures and their proper accounting. The proper charging of repairs and equipment, reclaimed apparatus and material should be according to the accounting methods and rules prescribed by the Public Service Commission in order to reflect the correct amounts chargeable to plant and capital accounts. A lively discussion followed, which proved that those present were very much interested in Mr. Knipple's talk.

The next speaker on the program was Senator W. E. Bowers of New Haven, Indiana. The senator expressed his views quite candidly in regard to the defeat of House Bill No. 75, which had as its purpose the abolition of the Public Service Commission of Indiana. It was largely through his efforts and hard work that this bill was defeated. The senator was very emphatic in his statement that the abolition of the commission and return to local control of public utilities would be a step backward. The danger of putting the public utilities back into politics and disorganizing the uniform operating practices and rates established by the commission would tend to greatly decrease the efficiency of the service and would very much interfere with the future progress and expansion of the telephone business. It is evident that a set of men who have made the business of public utilities a thorough study and who are backed by the state are able to supervise and protect the interest of both the utilities and the public more intelligently and successfully than local authorities who are subject to political influences and changes in administration every few years.

The final number of the program developed into an inspiration meeting. Responding to the call of the chair for five minute talks the following gentlemen readily consented by relating their experiences and giving helpful suggestions on various matters connected with the telephone business, especially in the matter of assisting one another in times of trials and tribulations, due to adverse criticisms of the public and especially when enforcing higher rates to which the public, as a general rule, has the bad taste to object: Harry Wilder of Angola, Mr. Lewis of South Bend, Guy Hardenbrook of Albion, A. H. Krieg of South Whitley, A. E. Smith of Indianapolis.

This concluded the meeting and after rising to a vote of thanks for those who participated in the day's program and made it such a success the meeting adjourned.

The operators school, held in connection with the meeting, was conducted by Mrs. Kittie H. Williams, the instructress of the "Home" and "Bell" operators, in "The Home" auditorium. Mrs. Williams has had considerable success in training telephone operators and her practical knowledge and wide experience in operating enables her, not only to teach successfully but also to inspire her students with a sense of the importance and great possibilities of telephone operating as a profession.

Enosburg Falls Holds Annual Meeting

At the annual meetings of the Northern, Central and Citizens Telephone Companies, whose headquarters are in Enosburg Falls, Vt., the following officers were elected for the ensuing year:

Northern—O. Merrill, president; H. A. Puffer, vice-president; C. L. Ovitt, secretary and general manager; J. Kent Perley, treasurer; F. H. Ovitt, superintendent.

Central—O. Merrill, president, G. H. Branch, vice-president; H. E. Wright, secretary; J. K. Perley, treasurer; C. L. Ovitt, general manager; I. B. Bixby, superintendent.

Citizens—H. A. Slayton, president; F. G. Fleetwood, vice-president; J. M. Kelley, secretary; J. K. Perley, treasurer; C. L. Ovitt, general manager; E. E. Schutt, superintendent.

The three companies have in operation 4,301 instruments, the Northern having 1,468, the Central 1,106, the Citizens 1,727.

Northern Illinois Telephone Men Meet

Topics of vital importance with reference to policies and management of the business, were discussed at a convention of the Northern Illinois division of the Independent Telephone Association at its recent meeting at Galesburg. About 89 delegates attended the session, which was divided into two parts, first a conference of the executive heads of exchanges in the northern part of the state, in the morning, and a school at which chief operators were instructed in the latest methods in their work, with a view to improving service, conducted in the afternoon.

R. E. Gordon of El Paso, president of the Illinois Independent Telephone Association; J. G. Mitchell, Springfield, secretary and treasurer; Louis Pitcher of Dixon, president of the Northern District Association, and George X. Cannon, Freeport, secretary and treasurer of the latter organization, were among those present at the meeting.

Two hundred exchanges were represented at the convention, delegates to which were the guests of the Galesburg Union Telephone Company.

Chief operators of the various exchanges in the district were sent to this session at considerable expense in order that the general public might be benefitted by better service, as the result of the instruction which the girls received at this time.

The convention was a complete success from every standpoint, it was stated by the attending delegates.

The Girls Who Answer Your Telephone

Telephone operators are human and should and must be recognized as such. Like every one else the girls at all telephone stations make mistakes—not wilfully, however—and in most instances these mistakes are traced to the parties that call the exchange. If none of us would make mistakes there would be no use having the rubbers on the ends of lead pencils.

No telephone operator will deliberately mislead or misdirect any patron. Neither will they refuse to make connections when a number is called. Telephone girls as a rule hold a grudge against no one, but are frequently made the target of abuse from excited patrons, who overlook the fact that in this day and age the telephone is the medium for conducting not only business, but lovers transact their flirtations over the wires, and women as well as the men are ever ready to gossip over the phone.

We are all aware that these unnecessary telephone conversations are very often continued over a long period of time and it is usually at such times when a connection is sought with the same numbers. Failing to receive immediate connection the patron gets angry and the operator gets the blame.

It was ever thus and will always be thus unless the public comes to realize that a telephone is a medium for the transaction of business and not a toy or plaything.

The Telephone Condenser

A Non-Technical Description of the Condenser and Its Functions, Through Courtesy of the *Transmitter*

By G. L. WELLER

A CONDENSER, as the name implies, is a device for condensing or collecting anything, as steam or electricity. An electrical condenser is a piece of apparatus composed of two adjacent conductors or plates separated by an insulator for accumulating or condensing static electricity and is used in many forms for wireless telegraphy, power equipment, telephony.

The telephone condenser is known as the rolled type, since it is made of sheets of very thin tin foil and waxed linen paper, rolled together and encased in a tinned sheet iron can for mechanical protection and the exclusion of moisture.

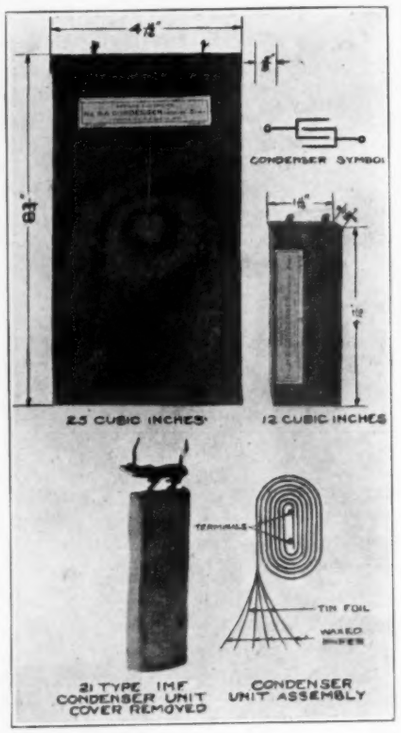
The condenser is built up of one sheet of waxed paper, one sheet of tin foil, then two sheets of waxed paper, followed by one sheet of tin foil and one sheet of waxed paper and rolled together. The lay of the paper and foil is such that there is always two sheets of paper between the foil after rolling. Paper is subject to so-called pin holes and metallic veins. If these holes or veins meet in the layers of paper, the condenser will be short circuited. By using two thin layers of paper instead of one of double thickness, it is not likely that bad places in two sheets of paper will fall in the same place.

The waxed paper is approximately nine ten-thousandths (.0009) of an inch thick while the tin foil is two ten-thousandths (.0002) of an inch. You will have some idea how thin the condenser sheets are by comparing them with this page of The Transmitter which is thirty-five ten-thousandths (.0035) of an inch thick.

Metal strips are wrapped into the tin foil to act as terminals before the condenser is rolled. The tin foil is very frail and it is necessary that terminals be provided which are stout enough to permit wires to be fastened to them.

After the condenser has been rolled, it is heated in an oven for several hours and then immersed in hot paraffine to drive out all moisture. The excess paraffine is then pressed from the condenser and it is placed in a container and sealed with a pitch preparation to exclude moisture. The insulation of a condenser must be kept very high, above 150 megohms, in order to keep it in an operative condition.

All bodies have the power of accumulating charges of static electricity, either positive or negative, on their surfaces. You no doubt have seen how rubbing the shell of your fountain pen across a piece of cloth will enable it to pick up a small piece of paper or how running a comb through your hair when it is dry has electrified your hair and the comb and that some of the hair has



been attracted by the comb and some repelled.

The amount of electrical energy which a body will accumulate depends upon its size, shape, the material of which it is composed and the proximity of other bodies. Opposite charges attract and hold each other while like charges repel. In the condenser, we have the two bodies as closely related as possible and get the greatest possible accumulation. It should be understood that the electricity does not flow through the waxed paper but that the action is across its surface by induction. The phenomenon of retaining and accumulating a large quantity of static electricity by two conductors when placed adjacent to each other and separated by an insulator is called electrostatic capacity.

Since a condenser is a storage space for electrical energy it is known by its capacity for holding this energy. The unit of capacity is the farad and a condenser is said to be of one farad capacity when one coulomb of electricity is required to raise its potential from zero to one volt. A coulomb is that quantity of current which will result from one ampere flowing for one second. The farad is too large a unit for ordinary use so that the millionth part or Microfarad is the practical unit. Condensers most generally used are 2 Microfarad capacity, better known as 2 M. F., or smaller.

If a condenser is connected to a source of direct current its plates become charged and current flows into it until it assumes the same potential as the source, after which it will set up a counter electromotive force and no further current will flow. If it is disconnected from the source it will retain its charge, until a circuit is established between the plates, through which it can discharge. It would appear from this that the condenser would answer for storing electricity instead of the storage battery. The size of condenser required for storing sufficient energy to be of practical value prevents its being used for this purpose.

The condenser is a barrier to direct current while alternating will apparently pass through it. Of course the alternating current does not actually pass through the condenser the same as it does through a piece of wire. What really happens is that the condenser charges and discharges, with the rise and fall in voltage and the reversal of current. The effect is the same as though the current were flowing through a conductor.

Condensers are connected either in parallel or series. When connected in parallel the capacity of the combined condensers is equal to the sum of the capacities of the separate units, that is to say a 2 M. F. and a 4 M. F. equal 6 M. F. Connected in series the effective capacity is reduced and the resultant capacity is the reciprocal of the sum of the reciprocals. An easier way to remember it is that condensers when connected in multiple or series act just the opposite to resistances.

The condenser is used most frequently in common battery service. In every subscriber's box we find the little black can which makes possible the use of the permanent magnet receiver and the present-day signalling. In the central office it will also be found in the

many circuits made possible by its use.

The condenser must not be looked upon as a cure-all, and its use should not be abused, since if it is used incorrectly it will become as much a hindrance as it is a help. The admittance of a condenser or the resistance to the flow of alternating current depends upon the frequency of the current, the resistance being high to ringing or low frequencies and low to voice or high frequencies. One of the popular mistakes of the past was to use a receiver in series with a condenser for observing purposes. As this caused a very serious loss in transmission on the circuit under observation its use was forbidden.

The condenser, like all other telephone equipment, is being constantly improved. One of the most marked improvements can be seen by a comparison of the No. 5 type condenser used in the earlier subscriber sets with a No. 21 used in the modern sets. The No. 5 requires 25 cubic inches of space while the No. 21 requires only 12 cubic inches, or less than one-half the amount of space occupied by the No. 5.

Citizens of Grand Rapids Makes Good Showing

The annual report of the Citizens Telephone Co. shows that for the year ending Dec. 31, 1920, the company made the largest net gain in number of telephones since 1906, the total net gain being 2,916, of which 1,271 were in Grand Rapids.

The entire system now has 41,486 telephones in service and switches for 3,883 roadways. The figure for the Grand Rapids exchanges are 17,828.

The gain for Grand Rapids would have been considerably more if material and equipment could have been obtained more promptly.

Nearly 2,300 local battery telephones were charged during the year to common battery. It is expected that ultimately the entire Grand Rapids exchange will be common battery, thus doing away with the use of batteries at the subscriber's telephone.

Plant account of the system was increased $166,735.22 during the year and depreciation charge was $270,131.16.

Regarding rates the report reads that rates in Grand Rapids are lower than in any other city of the same size in the United States and it is believed that the public will not object to any reasonable advance in rates, as telephone companies must earn a fair return for investors, a return that will bear comparison with the rates of other investments if they are to secure new capital with which to take care of the expansion of their business, and that present rates are too low to enable the company to pay a reasonable dividend.

The report adds that it always has been the policy of the company to consider service first and no effort has been spared to keep it as near 100 percent as possible.

Operating revenue for the year was $1,432,010.08, an increase of $243,721.42; operating expense was $793,901.67, an increase of $163,567.19; net operating revenue was $367,977.25, an increase of $29,818.04; gross income was $274,269.53, an increase of $14,323.34; net income was $178,851.28, a decrease of $25,443.93; dividends were $154,069.40, the same as the preceding year, and amount carried to surplus was $24,781.88, a decrease of $25,443.93.

The capital stock of the company is $3,851,735; bonds outstanding in hands of the public, $931,000, an increase of $106,500, and surplus, $315,622.45, an increase of $92,887.48.

Telephone Company to Spend $30,000 at Missoula, Mont.

An appropriation of $30,000 for the improvement of its system in Missoula has been announced through its local manager, R. Earl Rice, by the Mountain States Telephone Co. New cables will be constructed and extensions made with a general overhauling of the property.

"The work," Mr. Rice said, "will be started within the next thirty days, as soon as the weather permits. We will put in $14,000 worth of new cable and will spend about $12,000 in extensions to our buildings. Then, we will add two new toll positions for long distance operation and will install a new power plant.

"The building work will be let by contract and we will bring in a crew of experts to do the more technical part of the improvements. From six to fifteen of these experts will be required."

A New Disease Called Telephonitis

The art of listening to others talk over the telephone is as yet in its infancy. It has made no progress, apparently because the horrible inevitableness of it has come upon us all so swiftly that no defensive measures have matured. It is estimated roughly by the new department of creative inefficiency, says an "expert" in the New York Sun, that 40,873,648 hours and 45 minutes are consumed each week all over the United States by people thus made to suffer.

The complete returns are not all in so that these figures are subject to a later revision. The amount of food that grows cold through husbands waiting for their wives to converse over the telephone just as meals are announced is estimated by gross tons avordupois, as 2,743,250, F.O.B. and C.O.D. at all households

A thorough canvass of business houses in which men consume large quantities of cigars and indulge in subliminal cussing while their partners' ears are glued to the receivers, is now in process and will be announced later.

In this situation, it is to be regretted that those who talk over the telephone have far outstripped in endurance those who have to stand and wait and listen. To be drawn into an attachment with a telephone at any moment and say, "Yes, that's so" and "I know it" and "All right" and "I'll be there" and "Thanks, old man, for letting me know"—all this is bad enough. But the victims stand the strain much better than those who have to stand the listening.

One is a kind of occupation—often dismal, deadly and dull, but always with possibilities of satisfaction — especially when you are called up by your broker and told that the market is up ten points or by your best girl and told that papa and mamma have gone on a motor tour.

But the other is not an occupation—merely a lingering disease in which the sufferer prays for the sudden death of the man at the other end.

Making a Limit on Telephone Conversation

One of the New York state courts has judicially determined that five minutes ought to be the limit for telephone conversations on party lines. The decision is in a case where complaint was made because the girls of one family are given to tying up the line by "sparking on the wire."

The New York judge's decision is not final, but since it sets a judicial precedent, the outlook for young folks who do their courting by telephone is not bright. They would as well prepare to limit their telephonic exchanges of soft nothings.

It is rough on the fledgings, of course, but other folks who want to use the telephone insist that a limit be fixed, and judges are not overly sentimental. Most of them have forgotten their own courting days, when it took three hours of a Sunday evening for them to exchange a single thought with their adored one. Since it now takes them only a minute or two to talk to their wives over the wire, they are pretty to accept the New York precedent.

Enthusiastic Texas Convention

The 16th Annual Convention of the Texas Independent Telephone Association Is Held at Dallas on March 23-25

THE 16th annual convention of the Texas Independent Telephone Association was called to order by president Still, at the Adolphus Hotel, Dallas, on March 23.

The address of welcome was delivered by George Waverly Briggs, vice-president of the Dallas Chamber of Commerce who said in part:

"It will be a great pleasure to me and to the people of Dallas to bestow any courtesy on our guests. In you we recognized a type of men and women who, when they assemble in gathering like this, may be the means of exerting a wholesome influence upon American business. We all know that we are living in times that are somewhat unsettled and realize that business meetings such as these have a tendency to produce beneficial results."

C. A. Shock, general manager of the Associated Telephone Companies of Austin Sherman responded to the address of welcome. He assured Mr. Briggs that the delegates were delighted with the welcome they had received. He declared that the business element of the state at large could not do without Dallas, which was recognized as a metropolis, such as every state needs.

He characterized the telephone business as a peculiar industry and telephone men often found themselves in puzzling positions. It was, indeed, gratifying to them to have a man like George Waverly Briggs stand up and emphasize the important position in the business world they occupy.

The telephone business has not profited during the war, he said. While some business had made a large profit, the telephone industry had to be satisfied with four to seven percent. As a rule, most telephone men were optimistic and that optimism had pulled many a telephone man out of the hole. He closed by expressing the appreciation of the association for the cordiality of the city's welcome.

In his annual address President Still cautioned telephone men not to become careless when no competition exists, but to give the public as good service for fair rates as can be rendered. He stated that telephone plants should be well constructed and properly maintained, the operating forces trained and a general knowledge of operating practices acquired. Rates for service must necessarily be in line with those of neighboring telephone companies, and the treatment of patrons must compare favorably with the treatment accorded by other companies.

The president's address in part follows:

"It must not be felt that we, the Independents, are not serving our patrons in at least as perfect a manner as does our competitor, the Bell Telephone Co. In reality, we are in much better position to properly serve than they, for we are not hindered by a cumbersome organization such as they, of necessity, maintain. We can operate more economically to start with; can act more promptly in our dealings, and can adjust our rules to the needs of the territory whereas the Bell must have a general policy and general rules that cannot in many instances be changed and adjusted to the needs of certain towns, cities or districts.

"By this difference we hold a great advantage in competition along the lines being discussed.

"Let me point out to you a short-sighted policy that we Independents here in Texas have had in the past. This one was in our contention for 'other line' toll rates. By this system, we were able to exact from our patrons, rates that were in many cases exorbitant. One rate that I well remember as having existed under the old system was made up of separate rates of 25 cents for each of four toll circuits for two minutes' service, making a total rate of $1, whereas the distance from originating point to terminating point was about 20 miles.

"We were able to exact such rates and collect them or Mr. Patron got no service—but in doing it we made enemies of the few customers who paid the price. At once the customer compared the cost of toll service over Independent lines with that of similar service over Bell lines and it doesn't take a genius to figure out the conclusion of the 'skinned' patron.

"We have overcome this weakness, but not until ordered by the Postmaster General to make rates based on 'air line' mileage. The Postmaster General realized the unfair treatment being meted out by us and attempted to correct the fault. Of course, we bucked and pitched, but now I doubt if many of us would go back to the old system if we could. It is true that there are a few people engaged in business who are in for the temporary gain to be made, who will not look far enough into the future to see the advantage, which has been gained and, consequently, would go back to the old system or 'extortion' offered by the 'other line' system of rate making.

"My reason for dwelling upon this toll rate question is that I feel that without 'air line' toll rate basis we are not in a position to either frankly serve our toll patrons or to compete with the Bell company by offering to our customers the same service upon the same rates.

"Let us look to the future of our investment and not focus our eyes upon a temporary gain obtained by unfair treatment of those we want to hold as customers and friends.

"Aside from the matter of meeting the competition which I have mentioned, to my mind we have another important problem ahead of us—that is the way of combating a demand that will come for reduced rates for our service. This demand may not be general but it may grow to be pretty general, because of the fact that very few of us have failed to readjust our rates during the last four years.

"The reason for such a demand is easy to see and unless you make your case clear, you'll fail to convince your patrons that rates cannot be reduced to the same degree that they were increased, for to so reduce them is a matter of impossibility without doing a great injustice to ourselves and our patrons.

"Here are some facts and figures that should convince any reasonable man that general reduction in telephone rates must not be expected:

"Salaries to our employes have been increased approximately 60 percent. Salaries make up about 70 percent of all expenses and take nearly 50 percent of our total receipts. Few companies have annual gross receipts of more than 33⅓ percent of the amount invested in their plants. Not more than 18 percent of their gross receipts can be gross earnings. Taxes cost us from 8 to 10 percent of every dollar that we take in.

"Just analyze these figures and see if you can ever reduce your rates without cutting salaries and paying less taxes. Can we afford to cut wages? Can we expect to ever pay less taxes, or must we expect our taxes to climb upward? Answer these questions for yourselves.

"Rates for our service have been boosted to the extent of probably 25 percent on an average throughout the country. Some increases have been greater and some less, but this estimate will not very far miss the average."

E. C. Blomeyer, contract sales manager of the Automatic Electric Co., of Chicago, was called upon at the conclusion of the president's address. He presented to the association, with his compliments, a beautiful gavel of ebony and

ivory. Mr. Blomeyer stated that he hoped every time a meeting was called to order with this gavel it would mark some progress in the affairs of the association.

"Men or Methods," was the subject of his address. He gave some very interesting facts concerning the telephone industry and related some of its early history. He stated that more than 300,000 people are now employed in the telephone business. In the last 44 years the business has grown from nothing until now it surpasses all others, even the automobile business. Seventy percent of the business of operating a telephone system is personal—in other words, the human element is 70 percent.

In all this country there is no school where a man can go to learn to manage a telephone business. The only way he can learn is by hard experience. He asked if it wouldn't be a good thing for an association of this character to have a place to train exchange managers and others.

"You can't run any business, not even a garbage business, without proper training for it. I think it is the duty of a telephone company to help its people to learn.

"Speaking of the present financial situation, he said the balloon of inflated prices had burst and the country was returning to the normal. If there were ever a time when a telephone employe needed training, it is now. The men should be given every opportunity to learn and encouraged to stay on their jobs. Their latent talents should be developed and when an employe becomes capable, he should be advanced to a better position, or a better one should be procured for him with another company."

F. E. Shoup followed Mr. Blomeyer with a talk on toll business and the division of toll charges.

The following committees were then appointed by the chair:

Resolutions: L. S. Gardner, of Waco; F. W. Greber, of Brownwood; and J. A. Smith, of Fort Worth.

Auditing: R. S. Shelly, of Austin; A. T. Shipman, of Pecan Gap; and F. G. Almond, of Troup.

Credentials: J. C. Paxton, of Sherman; C. O. Dixon, of Grand Saline; and E. G. Fehrenbach, of Llano.

SECOND DAY'S SESSION.

J. Luther Stark of Ozark, opened the second day's session, with an address on "Fellowship in Business," which was followed by an address on "Minimum Wage and Other Legislative Matters," made by L. S. Gardner of Waco, who said:

"If the governor signs the bills pertaining to the minimum wage situation in Texas that have been passed by the legislature, then Texas will have a new minimum wage law; if the governor should veto both bills then the companies will be under the same old law. If he should veto the new minimum wage bill and sign the repeal bill, there would be no minimum wage law.

"The minimum wage bill as passed by the legislature will, if it becomes a law, give the commission a wider latitude in the administration of the law than the old act. It will permit the commission to zone the state, or divide it into districts, and fix a different minimum wage in each district; or the commission may make a different wage for different classes of employment; or it may fix a different minimum wage in each district or zone for different classes of labor.

TODAY.

Today is what you have. It is also what you are. And, again, today is what you do. And if you haven't anything, and aren't anybody, and do nothing—why, then for you there is no Today.

For Today is music. Today is art. Today is literature. Today is joy. Today is work. . Today is play. Today is life.

Yesterday is no problem—for it is past. Tomorrow is no problem—for it isn't here. Today is supremacy. Today is opportunity!

Crowd in upon it, then. Today—take hold upon its faintest chance. Spread your smiles—Today. Be game—Today. Be glad and great—Today.

Today, the day, is your day.

Today is time and change is doing its job. Are you a vital part of the play? Today you may start out all anew. Today you may put to use what you learned a day ago. The center of your entire life may revolve about Today.

But, above all things, do not fear Today. Let all worry slide. All things that do not count—let them go, too. Work and help and love—Today.

For this Today will never dawn again!—George Adams.

The law applies, of course, only to women and minors, a minor being a person of either sex under 15 years of age.

"The new law will also exempt all telephone exchanges in towns of 4,950 population or under, according to the 1920 census, providing the establishment or exchange does not employ more than 12 women and minors."

F. B. MacKinnon, of Washington, D. C., president of the United States Independent Telephone Association, in his address on "Telephone Problems of 1921," said that before the public could be brought to understand the necessity of higher and fairer rates, it would be necessary to wage a campaign of education to enlighten patrons on the trials that telephone operators encounter and the cost of operation. Such educational campaigns, he suggested, should be waged in every community.

He pointed out that the wages of telephone employes cannot be reduced in response to a demand for lower telephone rates, for the reason that they are only about normal at present. Before the war they were subnormal and were raised during the war so that now they are only on par with wages paid by other lines of business. To reduce them would be an injustice to the employes and would result in impairment of the service.

He insisted that the Independent companies must acquaint the public with the fact that they are giving a different and superior service and admonish them to stick together.

"Business Integrity" was the subject chosen by C. A. Sanford of Sherman, who made the opening address at the afternoon session. It was his opinion that Roger Williams and others like him were responsible for the high status of business integrity in this country. The little red schoolhouse and the little white-spired church also had aided in building it up.

He regretted that honesty has shown a decline during the last few years and as a remedy suggested that what was needed is a religion that will cover the whole world, teaching men how to respect their contracts, pay their debts, speak the truth and deal justly with their associates.

E. L. Case, assistant to the general manager of the Kansas City Telephone Co., Kansas City, Mo., followed Mr. Sanford. His subject was, "Utility Publicity and What the Newspapers Want." He discussed the subject exhaustively from the standpoint of a man who understands his business.

Mr. Chase explained the benefits of publicity to a utility, saying that publicity molds public opinion which undoubtedly will be favorable if the public is favorable.

Judge S. A. Lindsay, of Houston, president of the National Bank of Commerce of that city, and also president of the Gulf States Telephone Co., made a very interesting address on "The Financial Outlook—as Viewed by a Banker-Telephone Man." Judge Lindsay told what he considers the problems the telephone man will have to meet in a financial way during the coming year or so. He stressed economy in management and wise and judicious spending of the money that comes into the coffers of the company.

At 7:30 Thursday evening the annual banquet of the association was held in the Adolphus Palm Garden. Over 200 reservations were made for the delegates and their guests.

C. A. Shock, general manager of the Associated Telephone Companies, of Sherman, was toastmaster.

LAST DAY'S SESSION.

The last day of the convention was devoted to routine business matters.

The reports of the treasurer and secretary were submitted and accepted. Following this was a report of the various standing committees and convention committees.

The committee on resolutions recommended several minor changes in the constitution and by-laws of the association which were passed.

After the reports of the various committees the officers were elected for the ensuing year as follows:

President, R. B. Still, of Tyler, general manager of the Gulf States Telephone Co.; vice-president, F. W. Greber, of Brownwood, general manager, West Texas Telephone Co.; vice-president, A. J. Combs, of Fort Worth; secretary, L. S. Gardner, of Waco, secretary of the Texas Telephone Co.; and treasurer, J. C. Paxton, of Sherman, assistant general manager, Associated Telephone Companies.

The following directors were elected: J. Y. Rust, president, San Angelo Telephone Co., San Angelo; E. G. Fehrenbach, president, Central Texas Telephone Co., Llano; C. A. Shock, general manager, Associated Telephone Companies, Sherman; C. D. Longserre, manager, Bardwell Telephone Co., Bardwell; John A. Stratton, Texas representative, Kellogg Switchboard & Supply Co., Dallas; Merton Swift, manager, San Marcos Telephone Co., San Marcos; J. B. Earle, president, Texas Long Distance Telephone Co., Waco; A. C. Hughes, manager, Hughes Telephone Co., Alvord; and C. Echols, salesman, Electric Appliance Co., Dallas.

The convention then adjourned.

A Traffic Study of the Telephone Girl

What the Girl Expects from the Company and the Company from the Girl—the Subscribers Attitude—Courtesy Ohio Telephone News

By L. V. HARRISON.

I REGARD the traffic employment department as a most important one, as that is where the prospective employe's opinion of the company is formed, due to the fact that it is her first contact with her future employer. The one in charge of this work should not only be a good judge of people, but should possess the qualifications to convey the favorable impression of the company the applicant should receive.

The person in charge of employment should be capable of judging and securing the very best material with which to build an operating force that will give the service.

The best class of young women to employ as operators are those who have the ambition but not the time or money to study stenography, book-keeping or to take a teacher's course. I have never handled the work in any town where this class was not available, but it may require some study and work of the proper kind to attract them.

Personally I have never considered the factories and similar industries as competitors of the telephone companies in the labor market. They require and should attract an entirely different class of people. If they are competitors I would say that it would pay the telephone company to do a little investigating in their employment department. As a rule in the past we have only considered the applicant's moral standing, education, honesty and general health. These are all important but the most important of all is the appearance and the general mental characteristics of the applicant.

There is no truer saying than "Like attracts like," and once you get the right kind of applicant started, she will attract others of the same class. It is sometimes necessary to junk a switchboard because it does not give the service, and is also necessary at times to junk an operating force if they are not capable of giving the service.

Instead of discussing the phrases to be used by operators I would prefer to discuss only methods, or practices and things that affect an operator's work. In many cases chief operators and others think that phrases and rules are adopted solely to insure courtsey and politeness, rather than to promote uniformity. The ease and reliability of an operator's work is governed entirely by the uniformity of it.

I would like to say in passing that the rules and phrases in the world will not insure good telephone service as that depends on the spirit back of them. As an example of uniformity in work if all subscribers gave their numbers in exactly the same way, the operator's work would be fifty percent easier, provided the numbers were given promptly. I have found the four-figure telephone is of great assistance in securing uniformity from the subscribers. Of course, in large offices this method is not always practical. Also it is preferable to use a prefix where possible to indicate the ring rather than a suffix.

An objection to this plan has been put forward that it takes longer to get the number or that an operator is more liable to forget a ringing prefix than a suffix. There may be some merit to this objection, but it will be found in actual practice that the advantages outweigh the disadvantages.

Before promulgating rules and phrases in any office I think methods and practices should first be considered, and changes made where possible to make the operator's work easier. We should bear in mind that the public we deal with today is not the same we encountered in the early days of the business. All the subscriber wants, is to know what he has to do to assist the operators in rendering good service. All methods, rules, etc., should be based on this assumption.

As an example of this change in attitude we had the subscriber, even a few years ago, who reported the operator at once who failed to say "Number, please." Today all the subscriber wants is "number" or in any other word that indicates to him that the operator is ready to take his order.

As a matter of fact it is hard for an operator to say "Number, please," in a courteous and business-like way. She will either say it too sharp or she will drag out the phrase and in either case it leaves a disagreeable impression with the subscriber.

To get that spirit is worth more than the time and money that we have devoted to it in most cases in the past.

The foundation for the right attitude on the employes' part is respect for and confidence in the company, and the management. That is particularly true of women employes. Lax discipline will create this feeling of loss of respect as quick as any other conditions. There is not one company in ten thousand that would deliberately allow a condition of distrust to develop, but frequently it develops so slowly that we are not aware of it until it is too late. It appears in a great many cases that demands for increased pay are not due to the wage question at all, but to other conditions, and the employes seize on the money question as a basis for their demands.

The surest proof of this is found when the wage increase is granted that there is no change in the employes' attitude.

It takes time, patience and the right material to build up a good operating force. I do not pretend to be a judge of girls, but I think I am safe in making the following statements:

Girls are more susceptible to their environments than men. They are sensitive and are quick to resent anything that savors of not being a square deal.

Girls have not been working in this country long enough to not want to take some of the home atmosphere into their work.

They resent familiarity. They want to respect their employer and expect the same in return.

The first consideration when dealing with an operating force should be equal treatment of all operators in the application of rules and regulations.

Probably the one thing that has caused more trouble and dissatisfaction in operating forces than any other has been the practice of allowing old operators to do practically as they please. When this condition is encountered it will usually be found that the older operators are just as discontented as the newer ones.

Strict measures of discipline impartially directed to all will never create dissatisfaction. As a matter of fact the average group of operators have far more respect for the company that requires them to obey just rules than for the one that allows them to do as they please.

The next consideration is to interest the operators in their work. It is a mistake to treat them as if they were a lot of children. We all want to know what we are accomplishing in whatever position we occupy. To work to just obtain needed money for existence is necessary, but the desire to serve, that it so necessary in an operating force, will not be developed, unless they are told the result of their work.

We should remember that every operator as a rule, is looking for advancement and each one of them should be given a tryout at supervision, information, trouble clerks' work, etc.

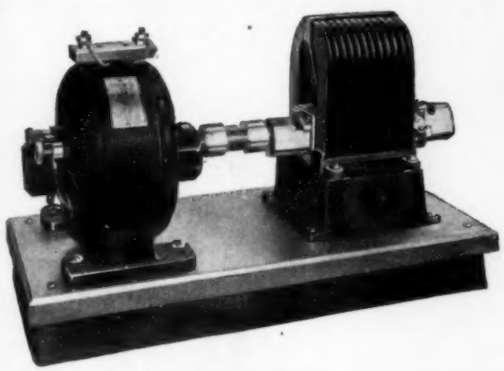
In so far as possible the operator's work should be judged as an entire group. It should also be impressed upon them that every subscriber should receive exactly the same grade of service. In other words no favoritism should be shown in dealing with the operators, and none should be permitted in dealing with the public.

Better results can be obtained by educating the public through the work of the operators than in any other way. As a rule every cent that is expended in the proper development of an operating force will be saved in some other way in the traffic department, or in some other department of the company. The above is a broad statement, but the truth of it will be instantly recognized by any official whose operating force has been developed along broad business lines and not in the limited way of merely telling an operator to answer a call and establish the connection.

It is my observation that the people today are thinking in terms of service. To them, telephone instruments, wires and switchboards are classed with the wires and generating stations of the electric light company or with the mains and plants of the gas company and they want good service from all of them.

They are willing to do their part and expect the telephone company to do theirs. Any public utilities relations with its customers are just exactly what the utility makes them.

There is no better time than right now to start getting the right feeling towards their work from the employes. They are more susceptible to reason than last year. However, I feel that any company that thinks the time is ripe to tell the employes as a whole where to "head in," will have as much labor trouble six months from now as they had last year.



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MACHINE SWITCHING TELEPHONE SYSTEMS

For Public or Private Exchanges

THE AUTOMANUAL SYSTEM—An automatic system without dials, in which a few operators control the switching machines of a large exchange.

THE AUTOMANUAL SATELLITE—In which the machine switches in distant villages are controlled from AUTOMANUAL keyboards at a city exchange.

THE DIAL AUTOMATIC SYSTEM—In which the machine switches are controlled by dials at the subscribers' stations.

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Tales of the Telephone

Bits of Humor and Verse With a Story or Two

Quite often when reading the lives
of the famous,
It seems that success means all
work and no play;
And, frankly, their fight for suc-
cess ought to shame us
When we compare notes with the
way of today.

Abe Lincoln read law books 'til
daylight was dawning;
Ben Franklin composed 'til his
eyesight grew dim;
Jim Watt mastered physics at four
in the morning,
While study 'til daylight was
Edison's whim.

They made themselves ready by
long preparation.
The goal was far, but they stuck
'til they won;
Accepting no pretext for one devi-
ation,
They followed the road 'til the
journey was done.

Success only visits the man that is
steady
And heady enough to sincerely
confess
That only men who have made
themselves ready
Are worthy and able to welcome
success.

* * *

The delivery department caught this one before it was sent out for delivery: "Fire was caused by defective wiring. Wire was not properly insulted." The missing "a" was perhaps added in somewhere else later on.

* * *

A party calling long distance and wanting the charges reversed, said: "I want this call turned around on the other end."

* * *

William Merkel, 30, told inquirers that he could not remember under just what circumstances he had climbed a telegraph pole in Newark, N. J., and gone to bed on the wires. A patrolman saw Merkel lying across the wires and sent in a call for reserves, but when disturbed, Merkel said he wanted to sleep.

* * *

The Telephone Girl

The Telephone girl
Sits stiff in her chair,
And listens to voices
From everywhere.
Hears all the gossip,
Hears all the news;
She knows who is happy,
And who has the blues.
She knows all our sorrow,
Knows all our joys.
She knows every girl
Who is chasing the boys.

She knows all our troubles,
All of our strife.
She knows every man
Who is mean to his wife.
She knows every time we are
Out with the boys.
She knows of our sorrows,
And knows of our joys.
She knows every woman who
Has a dark past;
She knows every man who
Is inclined to be fast.
In fact there's a secret
Neath each saucy curl,
Of the hair of that fair
Little telephone girl.
If the telephone girl would tell
All that she knows,
She would turn all our friends
Into bitterest foes.
She would sow a small wind
That would soon be a gale,
Engulf us in trouble and
Land us in jail.
She would let go a story,
(Which gaining in force)
Would cause half our wives
To bring suit for divorce.
She could get all the churches
Mixed up in a fight,
And turn all our day time to
Sorrowing night.
In fact she could keep
The whole town in a stew,
If she'd tell but a part
Of the things that she knew.
Now doesn't it put
Your old head in a whirl,
When you think what you owe
To the telephone girl.

Operator—We have your party. Drop in a nickel.

Party—I don't hear you.

Operator (desperately)—Drop in your party. I have your nickel.

Party hangs up.

* * *

Subscriber to Operator—"We moved yesterday, and carried the telephone with us to the new address; will you please have a man come and turn on the power?"

* * *

Beatrice, Ala., was calling a party in Greensboro, Ala., recently, and his wife answered. The operator inquired if Mr. C. was in, and on being informed that he was not, said: "Have him call Beatrice." The lady promptly and somewhat suspiciously inquired, "Beatrice who?"